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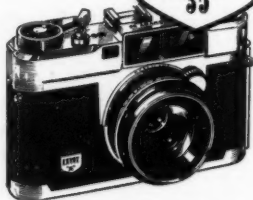


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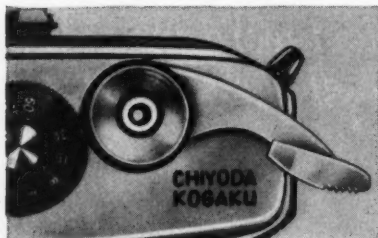


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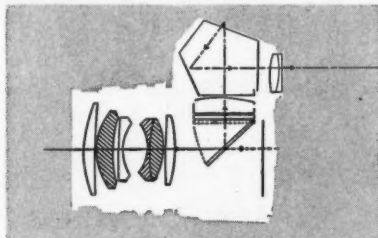


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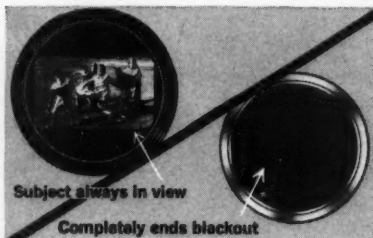
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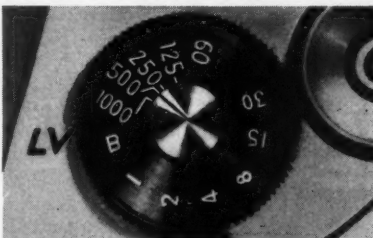
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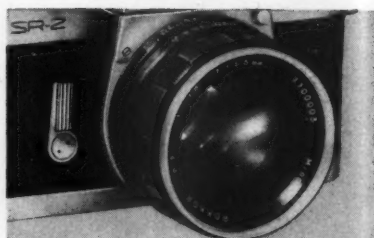
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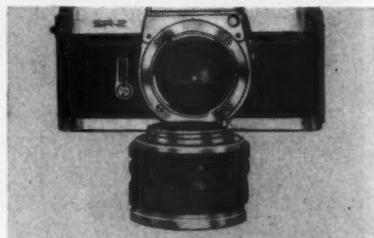
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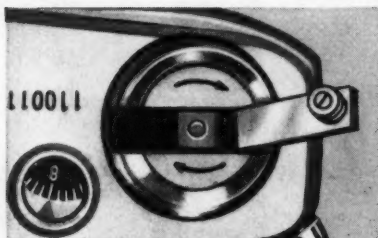
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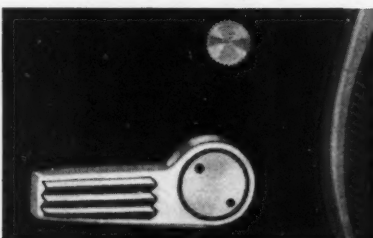
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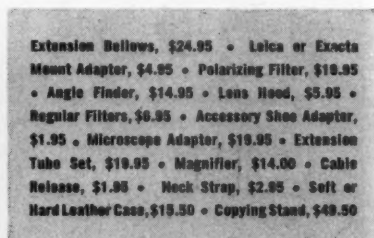
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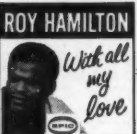
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Terre Haute, Indiana

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
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☐ REGULAR 

☐ STEREO 

1 15 30

2 16 31

3 18 33

5 19 36

6 20 37

7 21 40

8 22 41

9 24 43

10 25 49

11 27 50

12 28

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SEPTEMBER 1959, VOL. 23, NO. 9

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...the extraordinary story behind these 5 pictures

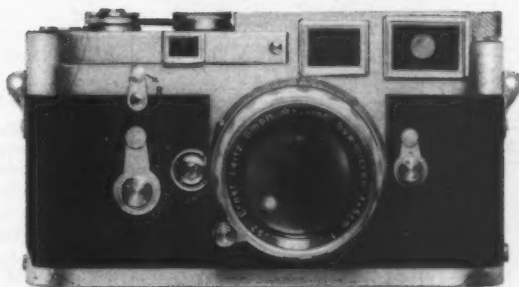
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Coffee Break WITH THE EDITORS

THIS MONTH'S COVER . . .

We're at it again! In the array business, that is, arraying what's inside out in front from top to bottom, from left to right. Taking it from the top we have top actress Erin O'Brien photographed by Don Ornitz with an Asahi Pentax, 135mm lens and Kodachrome. To continue: color, closeup, scenic, action. Seems clear enough and it's all here, along with the clearest story on lenses we've seen in a long time. Don't forget W. Klein. He follows—with an exciting eye. Lens drawing courtesy MODERN's Art Dept.

STOCKPILE . . .

We were impressed when Winfield Parks, Jr., of the *Providence (R.I.) Journal* picked up his third set of encyclopaedias awarded in photo contests of one sort or another (see "Coffee Break," November, 1958). But we were staggered to read in a recent correspondence with eminent PSA-er A. Aubrey Bodine: "... over a period of years I have won thirteen sets of Encyclopaedia Britannica and numerous dictionaries and year books." He hasn't kept them all. Just one set for his family. The rest have been donated to friends and schools in his native Baltimore. If anybody should know what's what and who's who, we'd guess it's you, Mr. Bodine!

THIS IS SO SCENTSIBLE! . . .

For the flashgun user who wonders whether he leaves an odor, Sylvania says, Yes, of course—but now it's a pleasant one. The flashbulb manufacturer apparently has been worrying over the smell of lacquer on its bulbs, and has perfumed it. A "mild floral scent," Sylvania says.

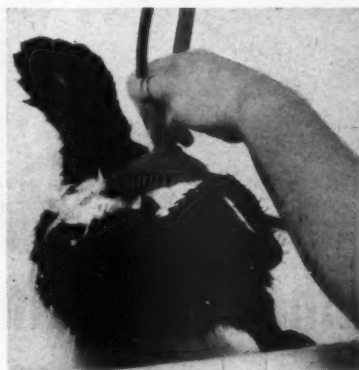
VERY BLACK-AND-WHITE . . .

When the human subjects escape, a photographer is apt to turn to the animal—even an editor may. We were disturbed recently by the plight of our executive editor who appeared with the usual frown, only for different reasons.

"It's the skunk," he said. Since he is generally given to somewhat strange remarks we paid little attention until it registered rather conclusively that he had said "skunk." He had meant, of course, "skunk." Well, it seems he owns or permits to reside within his house two skunks—mephitis mephitis (common, ordinary two striped Eastern skunk) and mephitis nigra (uncommon, unordinary Southern spotted skunk). He says they are pets. Without going into the

subjective reasons why one would keep these animals, let's approach it from a photographic angle.

He claims they are difficult to photograph in black-and-white. To begin with they are nocturnal—which means they sleep when most people are awake and are awake when most people sleep. In addition, they are black-and-white. The problem: How do you shoot them (pardon the expression) in black-and-white? Natural existing light in the evening or at night provides a well lit background. The dark skunk, however, appears as a completely blank negative image with no detail. Their eyes are so sensitive that they see best in the dark. Therefore, no direct flood. The editor tried bounce light. Result? See for yourself. No fur detail. How can you use direct light? Time exposure? Try it with a superfast skunk. Direct flash? Anybody have a spare set of sunglasses to fit a small skunk?



HERBERT KEPLER
Mephitis mephitis—bounced.

MUSAXE? . . .

What do you listen to when you go into the darkroom? Where on the dial do photographers' radio station selectors fall? Around MODERN, associate editor Ed Meyers says that Bob and Ray suit him best. He doesn't much like to print, anyway, and finds their chatter diverting. Says movie editor Matzkin, "I don't want to listen to anything when I print; it's the only time there's any peace and quiet." Contributor Norman Rothchild, on the other hand, who can be tracked down around the office by following the sound of German beerhouse songs, whistled, likes to print to the beat of Viennese waltzes or jazz.

There's a new record album out, goes something like *Music for Hunting Horn*, but so far we've not seen any photographers printing in their pink coats.

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ULTRA MINIATURE

by JOSEPH D. COOPER

Exposure problems with ultra-miniatures: How they differ from those with larger film-size cameras.



We all know that in recent years there has been a trend, in black-and-white photography, toward using the minimum exposure which will produce a printable negative.

This is true for all film sizes from ultraminiature to 8 x 10. One of the main reasons for this technique is changes in the make-up of the newer films (see Lloyd E. Varden's article "New Films" in the May, 1959, issue of MODERN). The advantages are greater ease of enlargement and less graininess.

Although these advantages hold true for all film sizes, they are most important in ultraminiature photography. In terms of magnification, an 8 x 10 print from the average ultraminiature frame is approximately equivalent to 24 x 36 from a 35mm frame. Obviously, while keeping graininess to a minimum may be desirable with 35mm, it is imperative with ultraminiature since grain is enlarged along with the image. Also, having a thin negative is particularly important in ultraminiature print making because of the greater distance from enlarging lens to easel—more than would be necessary to get the same size print from a larger film size. Since thin negatives transmit more light than denser ones, their value is obvious.

When shooting black-and-white, it is usually best to double the ASA based index of the film. Be careful though to check and make sure the recommended film speed of your ultraminiature film has not already been increased by the manufacturer or distributor. Most ultraminiature films are marketed by the camera distributor rather than the film manufacturer, and a number of them have already been up-rated. For some of the most commonly used black-and-white films original ASA-based ratings are: Adox KB 14, 16; Eastman Kodak Panatomic-X, 25; Kodak Plus-X Pan, 80; and Kodak Tri-X, 200.

With cameras of 35mm size and

larger, lens opening and shutter speed are usually varied interchangeably to get the correct exposure. But with ultraminiature cameras the problem of camera movement is much more acute, and I would advise that you always use the highest possible shutter speed, and vary your aperture. I always try to shoot at 1/100 sec., at least.

The Minox, of course, has a fixed lens opening of f/3.5, and shutter speed is the only variable. But there are filters built into the camera to reduce light transmission in case illumination is too bright to expose at f/3.5 and the top speed of 1/1000 sec.

There are no differences between exposure meter techniques for ultraminiatures and the larger cameras. Whether you have a coupled exposure meter, such as comes with the Mamiya-16 Automatic or the Minox B or an independent off-the-camera meter, here are some simple rules to follow:

1. Always take your reading from as close to the subject as possible, but take care not to cast a shadow with the meter. This is particularly important with close-ups, with portraits.

2. For contrasty subjects, take readings of the two extremes and average them. An exception is the situation where you are concerned with only one tonal area within the subject. Take only one reading.

3. For landscapes and outdoor scenes angle the meter down towards the ground so as not to include too much skylight.

A word about color: In projection, the problems of light transmission and light-to-screen-distance are the same as the problems encountered in enlarging black-and-white. So you should shoot for relatively thin transparency. However, instead of using the minimum exposure as in black-and-white, you get a thin transparency by slightly overexposing—and I mean slightly. I'm speaking here of reversal color film such as those ordinarily supplied for ultraminiature cameras, Anscochrome and Kodachrome, for example.

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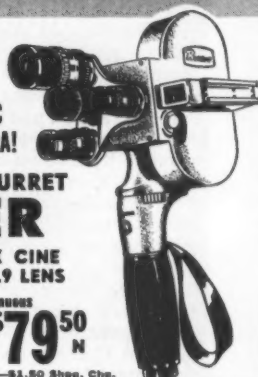
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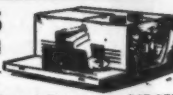
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LETTERS TO THE EDITOR

Prize Winner

Sirs:

This picture of two boys on a dock was returned to me with the routine letter after I sent it to you a few months ago. I exposed it on Verichrome Pan at 1/30 sec. and f/11 with a Duaflex IV, and printed it dark on purpose to make it more effective.

I don't know what kind of pictures your magazine favors, but this picture that you apparently did not consider good enough to publish in MODERN PHOTOGRAPHY won first prize in the Rochester Democrat and Chronicle Photo contest in the Children's Class. It also went on to Washington to the National Contest and won a special merit award in this class.

Therefore, I would begin to wonder about your "Monthly Contest" and just how good a picture has to be to get it published.

Rochester, N. Y. Mary Anne Doble

• See pages 76 and 77.—Ed.



One view of fishing

Anyone for a Pen Pal?

Here's a list of photography fans who would like to correspond with other MODERN PHOTOGRAPHY readers.

Mr. H. K. Bailey, 25 Lindsay Tce., Kadina, South Australia

Mr. Werner Bork, Berlin-Lichtenberg Weitlingstr. 41, Germany

Mr. Karel Krahulec, Oldrichova 43 Praha 2, Nusle-Udoli, Czechoslovakia

Mr. Horst-Dieter Kuhlmann, Westfeldstrasse 44, Witten-Annen, Germany

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New Photo Books

GARDNER'S PHOTOGRAPHIC SKETCH BOOK OF THE CIVIL WAR, text by Alexander Gardner, 100 full page plates. Dover Publications, Inc. \$6

Poor Gardner. When photographic giant Mathew Brady walked the battlefield, such a capable craftsman, intuitive reporter and fascinating writer was bound to be buried 'neath Brady's flair for portraying the dramatic, the historical event, the important personage.

We are in debt to Dover for a delightful photographic gem. In 1866, Gardner, a Scotsman brought to the U. S. by Brady, published two volumes of photographs by himself and his assistants. The lucid captions were by Gardner himself. Now Dover has published the volumes, frontispiece and all, plus the original Gardner introduction. They make a splendid, handsome, well printed volume that will itself become a collector's item. After seeing the Brady shots time and time again, Gardner's work is exceedingly welcome. Gardner combines his descriptive photographs with textual material in such a manner that together they produce a fascinating and most complete view of every Civil War scene Gardner cites.—H.K.

LOOTENS ON PHOTOGRAPHIC ENLARGING AND PRINT QUALITY, 5th edition by J. Ghislain Lootens, revised by Betty Carol Brown. 266 pages. Amphoto, N. Y. \$4.95

Betty Brown's revision of the already informative and complete J. Ghislain Looten's manual on enlarging and print quality is extremely successful. Of special note is the information added to the chapter, "Variable Contrast." Miss Brown brought the explanation of Varigam up to date. She also introduced an explanation of Eastman Kodak Polycontrast and Ilford Multigrade papers. Many of Mr. Lootens' illustrations were replaced with contemporary, imaginative photographs. However, the reproduction of these photographs leaves much to be desired.

All considered, this book remains a "Bible" on printing.—E.M.

PRINCIPLES OF CINEMATOGRAPHY, by Leslie J. Wheeler. 472 pages, many illustrations. Fountain Press. \$12.75

The average amateur or semi-professional movie maker might quite conceivably go through life never getting beyond the ABC's of movies—if he depended on the majority of the "literature" readily available to him. Most amateur movie books have the

technical information one would expect to find in a box of breakfast cereal.

Thus, we approached *Principles of Cinematography* with prejudice—and quickly got our comeuppance. The British do not use titles or words loosely and "principles," as used here, means just that. But don't get the idea that the language in this book is *way out*. It's definitely readable.

It's designed primarily for the serious 16mm film maker—but there's no reason why 8mm fans can't benefit from it. Certainly, anyone who wants to get beyond the movie snapshot stage will find a lot that's helpful in this book. After covering general photographic principles, the author goes on to camera design, processing, quality controls, the projector, sound, 16mm cameras and accessories, 16mm films, and finally modern motion picture trends. One chapter deals with 35mm motion picture work.—M.A.M.

GEVAERT MANUAL OF PHOTOGRAPHY, A.H.S. Craeybeckx, chief editor. 459 pages, profusely illustrated. Gevaert Photo-Producten N.V., Antwerp, and Fountain Press. \$3.50

A magnificent, learned undertaking which covers theory, sensitometry, optics, processing, color photography, but alas, with one flaw. It limits all discussion regarding sensitized products, film, developers, papers to Gevaert materials. If you are a Gevaert user, however, own this volume, by all means.—H.K.

This book is not available from **AMPHOTO**.—Ed.

FILTER GUIDE, by Norman Rothchild and Cora Wright. 128 pages, many illustrations. Amphoto, N. Y. \$1.95

Norman Rothchild and Cora Wright have put together an excellent guide book explaining where, when and how to use filters for color and black-and-white picture taking. The guide is written expressly for the amateur. Photos used as examples are of the kind every amateur makes or would like to make. Charts are complete. They range from how to get those fluffy clouds with black-and-white Pan films to using color films with various light sources.

Plenty of useful filter information is in the *Filter Guide* sitting there ready to be absorbed. However, if you want information on a specific filter or conversion in a hurry, there's no index.—E.M.

These and other books are available through **AMPHOTO**; see pages 24 & 25.



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duplicating, availability of filters and even some new color temperature meters!

One common complaint among my friends dates from the introduction of Eastman Kodak's Ektachrome. "If Kodak will process my Kodachrome and Kodacolor," they moan, "then why won't they handle my Ektachrome?" I was never able to discover the reason for the postponement of this service, but now, as if produced by the power of popular demand, it's here.

Prices for processing and mounting the following sizes: 127, \$1.50; 828, \$1.10; 135, \$1.75. Prices for processing without mounting: 127, \$1.40; 828, \$1; 120 and 620, \$1.40; 135, \$1.50. (Incidentally, the familiar prepaid mailing bags supplied with Kodachrome will also come with Ektachrome.)

Another thing that you, the color photographer, have been missing is finally available from Kodak: transparencies from square 2 1/4 or 1 1/2 in. Kodacolor negatives. The actual image (1 1/4 x 1 1/4 in.) is slightly smaller than that of a Super Slide (1 1/2 x 1 1/2 in.) and comes in a 2 x 2 cardboard Ready-Mount suitable for use in any standard 35mm projector. Incidentally, your 2 1/4 x 2 1/4 negatives are not cropped to make the slides. The entire image is simply reduced so you lose no picture area. Cost per slide: 30 cents.

Have you ever been disappointed with slide duplicates that were lacking in correct color balance and contrast? Of course if you can pay custom lab fees, you do get quite good results. But for a happy surprise at a moderate price investigate two special services offered by Eastman Kodak Co. and Ilford, Inc.

In the Kodak technique, a masking system is used. To mask doesn't mean to crop. A mask is simply a weak negative acquired by contact printing on panchromatic black-and-white film; in the Kodak process, filters are used when making the mask. The mask is then bound in register with the original and acts to control color balance and cut contrast during the exposure for the duplicate. A same-sized masked

duplicate costs \$1.50. If you wish to have a 2 1/4 or larger transparency duplicated on a 35mm slide, the price is 70 cents with lower prices for large quantities. To this you should add the \$1.50 charge for masking. You can indicate your own cropping for the duplicate.

It may seem a mad scheme to order duplicates from England, but Ilford's service is so good, it's well worth the trouble. Believe it or not, duplicates I saw at an Ilford trade show were so faithful I couldn't tell them from the originals! Medical and scientific photographers will welcome this excellent near-facsimile reproduction. You can send only 35mm Kodachrome or Ilford color slides to England for this process, since only these two films are correctly balanced for the technique used. (Incidentally, Ilford color films are not currently available in this country.) Price: \$1.50 per slide, slightly less for large quantities. For more details, contact Ilford, Inc., 37 W. 65 St., New York 23, N. Y.

If you've become a bug on the Decamired filter system, you'll be interested in the developments along that front. The Decamired filter system—where color correction is obtained by using singly or combining a graduated series of filters—has not yet offered the full range of filters needed for complete control. The search for exact correction will now be aided by these new filters: Enteco, R 1; Rollei, B 1, Tiffen, R 1.5; Hasselblad, B 1.5; and Accura R 9 and B 9.

As reported in the Photokina story (MODERN, Jan., 1959) you can avoid the annoyance of screwing and unscrewing retaining rings in the Decamired system. Lifa Decamired filters bayonet to each other with a half turn, are mounted in black nylon and thus won't strip threads when attached to lens adapter rings, other filters, close-up attachments or lens shades. These filters, supplied only in densities R B 1.5, 3 and 12, fit all standard series adapter rings as well as the Lifa bayonet adapter rings.

And by the way, two new color temperature meters will fit right into your Decamired filter work. Each reads in both degrees Kelvin and in Mireds and each has a dial on the back giving film and filter combinations.

The more expensive Lifacolorlux (\$49.50) reads from 1,900 to 20,000K and from 50 to 500 Mireds. But for ten dollars less you can have the Lifacolorlux Baby (\$39.50) which reads from 2,400 to 11,000K and 50 to 450 Mireds. Lifa filters and color temperature meters are distributed by Standard Camera Corp., 319 Fifth Ave., New York 16, N. Y.—THE END

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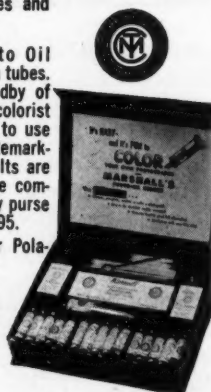
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THE WELL TRAVELED CAMERA

by the editors

Italy in fall: photographic paradise at a surprisingly low cost—if you are careful and watch your dollars and lire, Part I.

By the time September rolls around, the average Italian entrepreneur mops the remainder of August heat from his brow, counts his summer tourist profits and remembers with some amusement the recently departed thousands of camera-carrying Americani banging into each other around every photographic spot.

Now the fall season begins, clear and warm (65 to 70° average with one day of rain in the three weeks my wife and I were there), the season known as the connoisseur season when Europeans themselves start traveling to visit one another's favorite watering holes. The average American with camera and with, or without, family who takes advantage of the so-called "off-season" low travel and hotel rates will have much easier and more entertaining going than his early bird friend who made the trip when it was fashionable—in summer.

I insist that you will enjoy Italy ten thousand times more fully if you plan to travel up and down the peninsula by car. A car's too expensive? Nonsense. Cut down on your other expenses. For this purpose, I strongly recommend traveling by Icelandic Airlines, a regularly scheduled fleet which takes more time (about 24 hours in all) getting you there, but does get you there much cheaper than even the least expensive tourist or economy flights of other airlines. You can go roundtrip to Hamburg (with stop-over privileges in Copenhagen, Denmark, Gothenburg, Sweden) for \$441.10 complete between Sept. 1 and May 1 (the low season). From Hamburg, you can take a fast overnight train to Munich and from Munich you drive south through beautiful, inexpensive Austria, through the Brenner Pass into Italy. I think you'll find that a car rented in Germany will cost you less in the long run (two weeks or more) than a car rented in Italy where rental is quite high. And don't pick the fastest, biggest, most powerful car you can find, either. If you want to speed everywhere, stay in the U. S., and spend your money traveling over our own superhighways.

Aside from the Icelandic Airlines

savings, I'd like to recommend one of the most fun and most helpful travel books ever written, *Europe on 5 Dollars a Day*. The author, Arthur Frommer, has packed this \$1.95 volume with the cream of Europe's hotels and restaurants—not the tourist traps but the less expensive and often better places where Europeans themselves stay and eat while traveling. We could always tell when we were approaching a Frommer-recommended restaurant by the din of Italian gabble and good fellowship emanating from the establishment. We tried scores of Frommer restaurants and many hotels. As a result, we rubbed shoulders with Romans, Veronese, Sienese, Florentines, etc., with far better camera subject material than we would have run into at the American-catering hostilities. Between Frommer and IAL airlines, you'll save enough for that car rental.

Keeping in mind that you may have along with you someone or ones far less interested in the photographic angle than yourself, we recommend an itinerary to please everyone. We'd suggest you leave Florence and Venice to the last, because they are dessert, photographically and culturally. Anything after them is an anticlimax. Briefly, we'd suggest a tour starting in the north, taking you down through Verona, Bologna, by-passing Florence until the return trip, then on to Siena and finally reaching Rome. If you have only three weeks from the time you land in Hamburg, Rome is about as far south as you can go without taking your vacation at an express-train pace, figuring two or three days stopover in each of the cities we've mentioned. After Rome you can head back up to Florence, then on to Venice, finally leaving Italy via the Gross-Glockner Pass into Austria. From there you can complete the tour back to Munich.

While there's ample photographic justification for stopping in Verona and Rome, your big splurges in film and time should be in Florence, Venice, Siena and along the route wherever you stop. We'll leave the cities for a later date and concentrate on this last important facet of traveling by car.

We recommend stopping, particularly in any of the delightful mountain villages on the road between Florence and Siena. If you've ever thought to yourself, "I could take pictures just as beautiful and moving as any of those

(Continued on page 22)

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TRAVEL

(Continued from page 20)

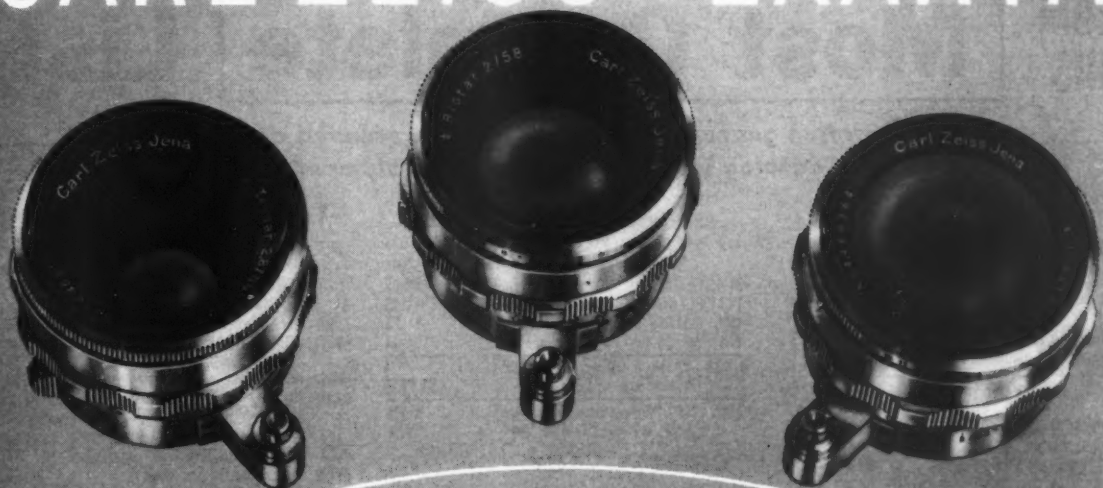
photojournalists if I only had the right subjects," one of these small towns is a good place to prove it. Against backgrounds of pink and white stucco-faced houses, liberally pock-marked by ricocheting bullets from World War II, sit the women, dressed in black from 15 to 100 years old, sewing and embroidering, tending children. We stopped our car in the main square of one, Barberino Val d'Elsa with some apprehension. We remembered the unfriendly frowns and the out-stretched palms of the natives when we were in the West Indies. At the sign of a scowl, we were ready to take off. As soon as the motor stopped, all the village elders, and some great portrait possibilities they were, too, crowded around the car and began asking questions. My wife tried to answer them in recently-learned Italian with some help from the Berlitz phrase book (don't be without one). Why they surmised that we had actually stopped to photograph the village, we had all we could do to stop them from gathering every villager in the main square for us. They were pleased to think that we had selected their village to photograph and were proud to have us do so. We spent two or three hours in the village, walking every street. We were always greeted pleasantly. Consequently, the old adage about using long lenses when in strange lands didn't hold true. In Barberino, as elsewhere in Italy, people were photogenic and cooperative. You could come as close as you wanted with a wide-angle lens or stand off further with a normal. The group of photographs made that afternoon is among the greatest prizes of our European trip.

Incidentally, a word on films. The light in northern Italy in fall, even on cloudless days may be bright but it's not too contrasty. We found that Kodachrome with its limited exposure latitude covered the entire range of brightness when we averaged our highlights and shadow readings. The rich brown earth and greenery seemed to warm up the atmosphere so fully that no filters, not even a skylight, was necessary. In black-and-white you can use the very fine grained but slow films and plan on really getting quality in your final enlargements.—H.K.



Everyone in the tiny mountain town of Barberino was gracious, smiling, photogenic. Miranda, 50mm Schneider Xenar, f/2, Plus-X, 1/60, f/16.

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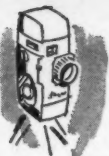
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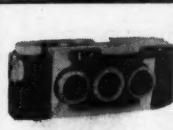
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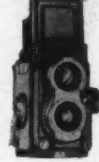
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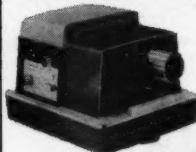
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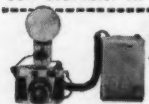
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the LARGE CAMERA

by **ANDREAS FEININGER**
Staff Photographer for *Life Magazine*

Here are some facts and opinions
about two aristocrats among view
cameras—Sinar, Kardan-Color.



of my personal experiences with each camera.

The Kardan-Color is manufactured by the Linhof Prazisions Kamera Werke in Munich, Germany, while the Sinar is made by Sinar-Fachkamera-Bau in Schaffhausen, Switzerland. The Kardan-Color is available in both the 5 x 7 and 8 x 10 sizes. Three models—the 4 x 5, 5 x 7 and 8 x 10—are offered if you're interested in buying the Sinar.

The basic 5 x 7 Kardan-Color camera (without lens) sells for \$299.50. the basic 5 x 7 Sinar costs \$449.

Both the Kardan-Color and Sinar have a backbone consisting of an immensely strong, tubular monorail on which front, back and auxiliary standards slide back and forth. The bellows of both cameras can be extended by adding extra units.

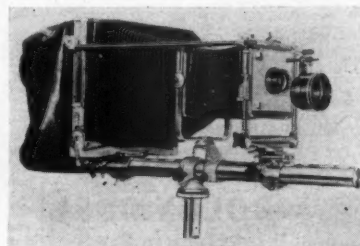
Additional tubes can be added to the monorail, and extra-long interchangeable monorails are available to provide for any required bellows extension. Auxiliary standards can be added to support extra bellows, filter holders, adjustable lens shades, etc.

Both cameras are equipped with a complete set of front and back swings. The extent of these swings matches (and even surpasses) the covering power of any lens that might conceivably be used on either of these cameras. It goes without saying that both the Kardan-Color and the Sinar combine such desirable qualities as versatility, rigidity and exquisite workmanship.

Reduction backs for all film sizes are available for all models of both cameras, even down to 2¼ roll film. Conversely, camera backs in larger sizes are available, too. If you start out by buying a 4 x 5 Sinar and later

find you need an 8 x 10 all you have to do is to acquire an 8 x 10 back and the corresponding bellows. Then hook them up to your 4 x 5 front.

The front standard and monorail are the same for all three Sinar models, and the same is true of the two Kardan-Color models. What you previously bought can be converted into a new kind of instrument specifically adapted to any imaginable use.



Sinar—lightweight

Front and back tilts of both these cameras are designed differently. Kardan cameras are built with all tilts on horizontal optical axes. On the other hand, tilts on the Sinar cameras are base-centered.

In this respect the Kardan construction scores a point over the Sinar, since tilting the lens or the back does not necessitate refocusing. Refocusing is mandatory when using the Sinar's tilts. This operation takes only seconds, so I consider this point of difference unimportant.

(Continued on page 90)



Kardan-Color—axial lens tilts

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35MM

by JOHN WOLBARST

**Tripod sense and nonsense. Or, how
to pick one suitable for 35mm work.**

You'd think it would be no problem at all to pick out a good tripod for use with 35mm cameras. Well, it's not just a simple matter of getting something that's light enough not to be a nuisance and sturdy enough to hold the camera steady.

Just as with the photographer, it's the head that counts, man—it's the head. That's the piece on which the camera sits, but not the photographer.

If you never take a vertical picture then you've no tripod problems. Practically anything will do. But many tripods are so designed that it is impossible to attach a 35mm camera in vertical position and still retain freedom to tilt it up or down or turn it from side to side.

After getting a few letters on this topic I decided to collect some samples of what's available and try to set up some criteria to help in choosing a tripod. So, let's start at the top.

Essential #1: The head must be so designed that the camera can be changed from horizontal to vertical position without the need to loosen the tripod screw, and must provide full fore and aft tilting and sideways turning movements for both the horizontal and vertical camera positions.

If it won't do this, don't buy it for use with a 35mm camera. It may be great with a twin-lens reflex or something else, but it's not for 35. An additionally desirable head feature is the ability to lock the camera in any position partway between horizontal and

vertical. This is important if you need to set up the tripod where the ground or floor is on a slant, or uneven.

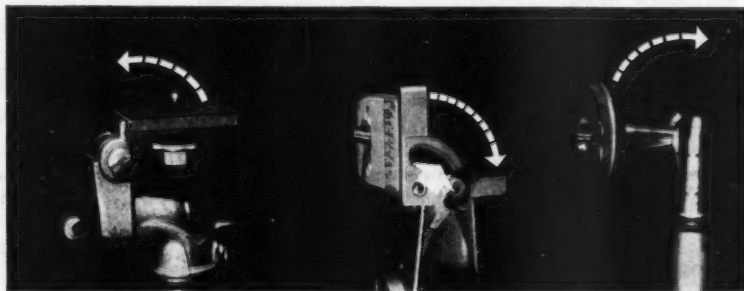
Essential #2: The legs must have the features of length, rigidity, weight, compactness, to make the outfit suitable to your needs. Never mind what kind of tripod Joe Blah, the ace photographer, carried to Tibet. What do you need in order to take your pictures?

If you have a lightweight little camera without interchangeable lenses (or some smallish ones) pick a tripod to match it. But, if you go in for long-focal-length plumbing, bellows attachments, ring lights, and other weighty accessories, don't expect some feather-light little tripod to be able to hold them steady—it can't.

If you're a big hiker, portability may be your main aim. But if you customarily throw a barrel of equipment into the car, a bit more tripod weight makes no difference.

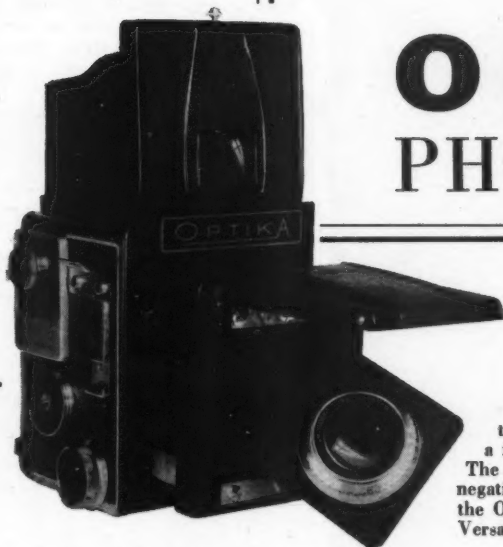
Essential #3: Make sure the controls lock, and unlock, easily and surely. Pay particular attention to the screw that holds the camera in place. Some of these are an absolute crime. They are too small to get a grip on, or too slippery to grasp, or so sharply knurled they cut the skin, or so surrounded by other parts as to be almost impossible to reach. And, no joking, be sure you can operate the works with gloves on when it's icy out.

Additional features: I would not buy a tripod that lacked a center pole. It may be either the rack and pinion
(Continued on page 32)



Tripods for verticals: Three makes, three design conceptions. Davidson Star D, left, has the camera platform on a side hinge. This model stops only in horizontal or vertical positions; other Star D models have a lock screw to hold the camera at any in-between angle. The Testrite, center, has a

hinged platform with a lock screw engaging a curved track (arrow). The Linhof, right, and some other European types use a single ball and socket for all movements; this locks anyplace. Other makes of tripods use these or different mechanical methods to permit verticals.



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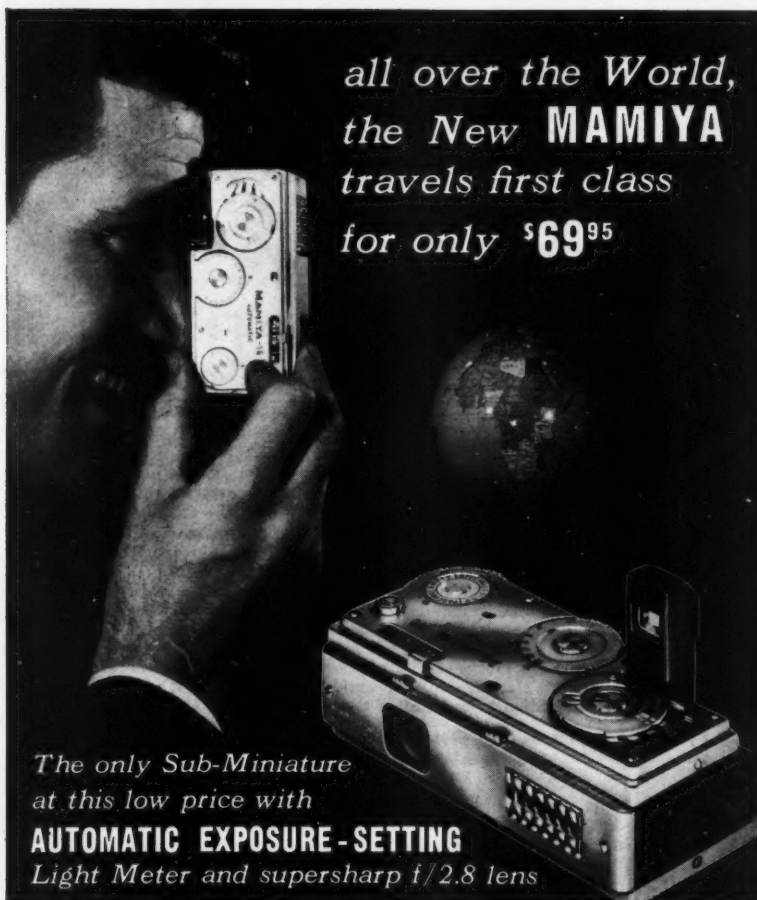
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35MM

(Continued from page 30)

elevator type or one which you just slide up and down by hand. This is a most important height adjustment, particularly for close subjects. Make sure the pole can be inverted—that is, to put the camera low to the ground between the tripod legs. This saves a lot of awkward trouble in shooting some low-to-the-floor object.

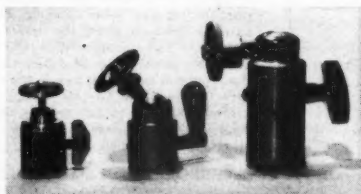
I prefer tripod legs with stops to limit the spread of the legs. Some tripods do not have these—the legs may

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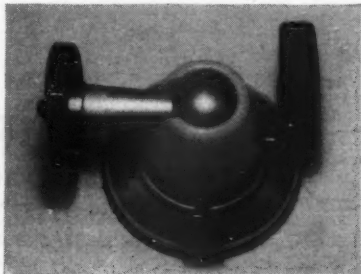
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be spread very wide. Straight out, in fact. While this may be a desirable feature, I have been successful in bouncing a couple of cameras on the floor while using such tripods, so I've given them up. At least, they ought to have light chains or cords between the legs to prevent sudden collapse.

Converting a tripod: If you have a tripod which is good, except for a head unsuitable for 35mm work, don't despair. It's frequently easy to convert these by adding a *kugelgelenkkopf* similar to one of those shown in the pictures below.—THE END



Handy adapters: If it's awkward to make verticals with your own tripod, add a ball and socket head to make it a handier device. Some examples: Tiny Accura, left, for small cameras, costs \$1. Hasselblad version, center, \$6.50, will hold heavier cameras. Husky KGOON, by E. Leitz, \$9.90, is for big stuff. Schiansky, below, permits separate panning (square knob is lock) with tilt top secured in any position. Any of these ball-joint devices can either supplement or replace your tripod head.



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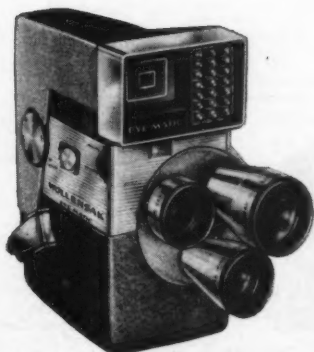
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NEW products

Alpa b Has Rapid Return Mirror



The new Alpa b series 35mm single-lens reflex cameras feature a rapid return mirror which provides virtually uninterrupted viewing of image at most shutter speeds. The cameras may be purchased with either of two fully automatic lenses—the Switar 50mm f/1.8 auto-apochromat, or the new Macro-Switar 50mm with Visifocus depth of field indicator and focusing from infinity to 7 in. The camera will take six other lenses, all fully automatic, from 24mm to 180mm. Other lenses of greater focal length are available. Additional features of the new models are a new one-stroke rapid film wind and shutter cocking lever, split image rangefinder in the ground glass viewing system, and a reversed take-up spool which reduces film curl. The rangefinder has a 45° dividing line so it may be focused on vertical or horizontal lines. The focal plane shutter is neoprene coated and ranges in speed from 1 to 1/1000 sec. and allows intermediate settings. It has X sync. up to 1/70 sec., and FP sync.

The Alpa 8b (illustrated) costs \$439 with the Switar lens and \$499 with the Macro-Switar. Other Alpa models, 4b, 5b, and 6b, range in price from \$299 to \$459, depending on lens. Write: KARL HEITZ, INC. 480 LEXINGTON AVE., NEW YORK 17, N. Y.

Contaflex Super and Rapid



The Zeiss Ikon Contaflex IV and III models are being superseded by the Contaflex Super (see photo) with built-in exposure meter, and the Contaflex Rapid. Both have the f/2.8 Carl Zeiss Tessar 50mm lens, with front element interchangeability to allow use of the Pro-Tessar components, the f/4 wide-angle 35mm, and the f/4 tele 85mm, and the M close-up attachment with 1:1 ratio, and stereo attachments. The cameras retain the Synchro-Compur MXV shutter with speeds from 1 to 1/500 sec. A dial on front of the Super operates the ASA calibrated exposure meter. Diaphragm and meter are cross-coupled so that setting meter reads camera for shooting. Meter indicating needles are shown both in the viewfinder and on a window on top of the camera. An additional interlock is between lens diaphragm and shutter speed ring.

Features added to both models are single stroke rapid film advance and shutter cocking lever, collapsible re-winding crank, and film rewind lock, and a permanent accessory shoe atop cameras. Price of the Contaflex Super, \$199, and of the Contaflex Rapid, \$169. Write: CARL ZEISS, INC. 485 FIFTH AVE., NEW YORK 17, N. Y.

(Continued on page 36)

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NEW PRODUCTS

(Continued from page 34)

Exa With Automatic Lens



The Exa 35mm single lens reflex now comes with penta-prism finder and fully automatic four-element Meyer Primotar 50mm f/3.5 lens. Its shutter has speeds from 1/25 to 1/150 sec., plus B, and FPX sync. Features are a bayonet lens mount identical to the Exakta's (so that camera's wide-angle and telephoto lenses up to 105mm may be used); combined film transport and shutter winding; automatic film frame counter. Like the Exakta, the Exa can be used with extension tubes, microscope adapters, bellows extensions. Price of the Exa with Penta Prism and Meyer Primotar 50mm f/3.5 lens is \$99.50. Write:

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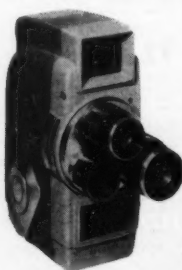
New Konica Gives Two Frame Sizes



The Konica 35mm rangefinder camera with six-element Hexanon f/1.8 lens allows you to have not only standard double frame (24 x 36mm) film size, but also single frame (24 x 18mm). You accomplish this through the front-mounted rapid film wind lever. A single stroke advances film one frame; two strokes, a double frame. (When shooting single frame, you must insert mask inside camera.) The 1:1 ratio parallax and distance compensating frame viewfinder shows both sizes. The camera also features a coupled exposure meter. Alignment of exposure needle with index marker on reading dial adjusts diaphragm to shutter speed. Seikosha shutter has self timer and speeds from 1 sec. to 1/500 with B, and MX sync. The camera also has a zero-return frame counter, tinted range and viewfinder image, a flush rear window to permit viewing with eye glasses, and hinged back. Price of the Konica IIM, \$129.95. Write:

KONICA CAMERA CO.
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Sekonic's New 8mm Movie Camera



The first 8mm movie camera to be placed by Sekonic on the American market is the semi-automatic Elmatic 8 with a 13mm f/1.9 Resonar lens and 9mm and 32mm converter units. The viewfinder has frames for each field and a two-position parallax adjustment. The meter has visible f/stops and allows adjustment for film exposure indexes of 10, 16, 32 and 40. The FPS speeds are 12, 16, 24 and 32. The semi-automatic exposure system works at only 16 FPS. Other features are built-in haze, neutral density and No. 85 conversion filters; meter zero adjustment; single frame; 8 1/4 ft. continuous motor run; footage indicator; and drop-in loading. The

(Continued on page 40)

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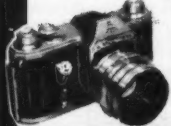
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3S (3½ x 3½) Square 127, 120, 620, 828, 127, 120, 620, 35mm } **25¢** 10 for **2.25**

3X (3½ x 5) each **1.00** 3 for **2.85**

5X (5 x 5 or 5 x 7) each **2.50** 2 for **4.75**

8X (8 x 8 or 8 x 10) each **2.50** 2 for **4.75**

LORD

FILM LABS



P.O. Box 243
New York 51, N.Y.



P.O. Box 46615
West Hollywood 46, Calif.

SAVE!



ONLY
\$470.00

BESSAMATIC CAMERA WITH VOIGTLANDER ZOOMAR LENS

Precision varifocal 1/2.8 lens maintains focus while zooming all focal lengths from 36 to 82mm. The Voigtlander Zoomar lens is completely automatic on the new Bessamatic. This is the new exciting 35mm single lens reflex camera with coupled exposure meter indicator in the focus.



BROWNIE TURRET FL.9 MOVIE CAMERA

Regular List \$67.50
Special only

\$49.95

ARGUS 75 CAMERA OUTFIT



Regular List \$23.95
Special - only

\$15.95

Reflex type viewfinder. Takes twelve 2 1/4 x 2 1/4 shots on 620 black-white and color. Synchronized for flash. Kit includes flash unit, portrait lens, case, pocket album, film, batteries, bulbs and flash guard.

ARGUS C3 STANDARD CAMERA

Special - only

\$39.95

Case, \$6.75 . . . Flash, \$5.95 . . . A really fine 35mm camera. Fast 1/3.5, 50mm lens. Speed range from 1/10 to 1/300 second. Focuses from 3 ft. to infinity. Uses 35mm color or black-white film.

KODAK SIGNET 30 CAMERA

Uses 35mm film. With fast f2.8 lens, eight speed shutter, zone and scale focusing, and single stroke film advance. Regular List \$55.00
Special, only

\$29.95

Sunset No. 1200 Recording Tape

Fully guaranteed
1200 feet on 7" plastic reel.

Special only
Regular \$3.50
\$1.89

KODACHROME (1960 Dating) Film

K135-20 - regular \$2.05 - special \$1.59
K135-36 - regular \$2.85 - special \$2.25
K459 8mm roll--reg. \$2.55--spl. \$2.25
K460 8mm mag.--reg. \$4.15--spl. \$3.29
Specify Daylight or Indoor Film.

WRITE FOR 66 PAGE ILLUSTRATED CATALOG
... Send 25c for handling. All items offered subject to prior sale. Supply of some items is limited. All orders filled in sequence. Add estimated shipping cost, or send 10% C.O.D. deposit. Highest trade-in allowance on your present equipment.

OAK PARK CAMERA CO.

Dept. No. M9 1023 Lake St. Oak Park, Ill.

NEW PRODUCTS

(Continued from page 36)

camera comes in two-tone satin grey crackle finish, and weighs 2 1/4 lbs. Price of Sekonic Elmatic 8 is \$89.50. Write: SEKONIC, INC., USA 130 W. 42 ST., NEW YORK 36, N. Y.

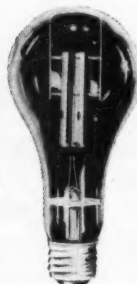
Compact 8mm Movie Editor



Walz's 8mm action movie editor-viewer has geared rewinds which fold so that the stored unit measures 7 x 8 in. The viewing screen is 2 1/4 x 1 1/4 in. Reels up to 400 ft. are accommodated.

Other features are: built-in film marker, film framer. The unit also has a focusing wheel plus a dry splicer with 18 Mylar tape butt splices. Price of the Walz action movie editor-viewer in carrying carton is \$34.95. Write: U.S. PHOTO SUPPLY CO., INC. 6478 SLIGO MILL RD., WASHINGTON 12, D.C.

A "Long-flash" Bulb



Sylvania's Flood-Flash FF-33 allows exposure of 37 ft. of 16mm film at 1000 fps, 75 at 2000 frames, and is designed for high speed motion studies. Its flash duration is 1.75 sec., 100 times longer than that of normal flashbulbs. The lamp is 5 1/2 in. tall, identical in size to Type 3 flash bulb. Lamps are packaged individually and shipped 24 per case. Price of each Sylvania FloodFlash FF-33,

\$2.35. Write: SYLVANIA ELECTRIC PRODUCTS 1740 BROADWAY, NEW YORK 19, N. Y.

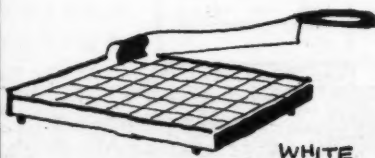
'Portable Darkroom' Changing Bag

The Accura Risomatic Changing Bag incorporates a rubber inner tube frame which inflates with air to form a "room" approximately 11 in. long, 10 in. wide, and 10 in. high, thus providing working space free of clinging material. The unit is applicable to loading film, unloading holders or movie film, or developing under field conditions. Price of the Risomatic Changing Bag is \$7.50. Write:

PHOTOGRAPHIC IMPORT. & DISTRI. CORP. 67 FOREST RD., VALLEY STREAM, N. Y.

Change of Prices: The Yashica Y16 ultraminiature camera now costs \$34.95; and the Yashica Y1 35mm camera with 1/2.8 lens now costs \$54.95. Write: Yashica, Inc., 234 Fifth Ave., New York 1, N. Y.

Correct Price: The new Carl Zeiss, Inc., 35mm Ikonette camera, listed in "New Products," July, is priced at \$29.95.



WHITE

KINDERMANN WEST GERMANY

features self-loading film loaders and reels



for
35mm,
127,
120 and
620 film.

Insert film into guide, then wind film on reel without fumbling, kinking film, finger marks etc. All parts are non-corrosive stainless steel. Kindermann film loaders and reels are hand operated, small, inexpensive. Individual reels and loaders list for \$4.95 each.

Combination reel and loader lists for \$8.95.

MULTIPLE AUTOMATIC REEL LOADER

for 35mm, 120 and 127 film

A must for quantity processing, the unit loads film onto stainless steel reels without the danger of finger marks. A unique open front housing stacks the reels to be loaded one above the other. Each reel moves down to the bottom of the housing. There the film is fed through a guide, into the small reel slot. A crank simply winds the film on the reel. When reel is fully wound it automatically drops out of the back of the housing, permitting the next empty reel to drop into place for easy loading. This automatic operation makes difficult jobs easy to manage. \$120.00 list



48" high TRULY PROFESSIONAL PROJECTION STAND

... precision engineered to meet your individual Audio Visual Requirements.



- Rigidly supports more than 300 lbs
- Quick setup; folds flat
- All steel tubular construction, vibration free

1. Overlapping frame.
2. Insulated formica top.
3. Micro tilting adjustment for top platform.
4. Safety spring locks prevent platform collapse.
5. Anti-tripping device prevents accidental up setting of stand.
6. Reel holder for spare film.
7. Floor leveling adjustment.

Double Platform as shown \$42.50 list
Single Platform also available \$32.50 list



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**FAMOUS
NAMES**

GREATEST CAMERA SALE EVER AT HAMILTON HOUSE
FANTASTIC SAVINGS—TIME PAYMENTS—10% DOWN—RUSH
YOUR ORDER TO-DAY, AND WE'LL PAY POSTAGE & INSURANCE

*The Lowest Prices
in Our History*



**FAMOUS KODAK
RETINA IIIc**

f2.8 XENON
Built-in
rangefinder. Ter-
rific value. List when
new \$175.00. **USED 69⁵⁰**
Case 6.95

FAMOUS

KONICA III

f2.8 LENS
List when
new \$119.75
USED 49⁵⁰
Case 5.50



**FAMOUS JAPANESE
ROYAL**

50mm 1:2 LENS
7-element coated lens;
single window coupled
SP. Flash synchro.
Rapid advance
case & SC flash 12.50.
BRAND-NEW 39⁹⁵



**BRAND-NEW & FAMOUS
EXA COMBO**

NORMAL & TELE LENS
You get both 50mm f2.8
Iscor Westar AND 100mm
f4.5 ISCO TELAR.
List price 109.50
Flashgun 8.50 **BRAND-NEW 57⁹⁵**
Deluxe Case 7.95



**FAMOUS KODAK
RETINA f2 XENON**

Coupled rangefinder. Com-
pur-Rapid shutter 1 to
1/500. List when new
\$197.75. **USED 39⁵⁰**
Case 4.50



**LENSES FOR EXAKTA, CONTAX,
EDIXAFLEX (specify)**

BRAND-NEW SAVE 60%
30mm f2.8 RODENSTOCK67.50
EURYOOM19.95
40mm f4.5 Meyer Wide Angle19.95
Heliopan34.00
80mm f2.8 CZ Tessar39.50
90mm f1.8 Angenieux39.50
100mm f4.5 Westar14.95
125mm f3.5 Austra32.90
180mm f5.5 Meyer58.50
250mm f5.5 Tele Major58.50
400mm f8.5 Tele Major99.50



**FAMOUS
BUSCH**

2 1/2 x 3 1/4
f4.5 LENS
Double extension bellows;
Coupled Rangefinder; drop
bed. Price when new over
\$300.00. **USED 54⁵⁰**



**CLOSEOUT POPULAR
8mm MOVIE CAMERA**

Famous-Brand Bell & Howell,
De Jux, Keystone and Revere.
(Specify choice.)
Roll film, f2.8
lens original
value 100.00— **29.50**
Magazine load,
f2.5 lens. Orig-
inal value 125. **39.50**



FAMOUS ARGUS C-3

f3.5 lens, coupled rangefinder,
synchro. List when new \$6.95.
USED 15⁹⁵
Case 4.25



**FAMOUS WEBCOR
TAPE RECORDER**

Double track; 2-speed; rever-
sible motor. Price
when new \$329.50. **USED 79⁵⁰**



FAMOUS ARGUS C-4

f2.8 coated lens; flash synchro
combined rangefinder viewfinder;
auto film transport. **USED 29⁵⁰**
Case 5.50



**FAMOUS
EDINEX-SYNCHRO**

f2.8 Rodenstock Heliopan
lens
alone worth twice the price.
Compur-Rapid.
List when new
\$9.50. **USED 29⁵⁰**
Case 5.50



FAMOUS CONTAFLEX II

f2.8 TESSAR
Built-in meter. List
when new \$179.00. **USED 79⁵⁰**
Case 6.50.



**FAMOUS AUTOMATIC SLIDE PROJECTOR
35mm ANSCOMATIC**

Handles both 35mm, 2 1/4 sq.
slide, stereo slides. 500 watt
lamp; blower cooled; 8"
mote control. **BRAND-NEW 79⁹⁵**
Plus your 300w projector.



FAMOUS AIRES IIIIL f1.9

MXL model at a real
value. List, when
new, is 99.95. Save,
case 5.50. **USED 39⁵⁰**



LATEST AUTOMATIC PENTACON FM

f2.8 AUTO TESSAR
With internal auto
coupling and built-in
RF prism. Current
price is \$249.50. **BRAND-NEW 117⁵⁰**
Case 9.50. Leaflet available.



LATEST EXAKTA VX IIa

f2.8 AUTOMATIC WESTANAR
Best reflex value. With factory regis-
tration and Ithage
WL finder and sports-
finder. **BRAND NEW 159⁵⁰**
With split-field pen-
finder add \$10.00. Case 10.50



FAMOUS GERMAN EDIXAFLEX

f2.8 ISCO WESTAR
Interchangeable lenses;
single stroke rapid ad-
vance lever; focal plane
advance lever; synch
speeds to 1/1000. Synch
for bulbs and electronic.
BRAND-NEW 58⁹⁵
Sold only with
deluxe case 9.50



EXAKTA REFLEX

f2.8 TESSAR
22 shutter speed (1 sec.
to 1/1000th) single stroke
advance lever; variable de-
lay action timer; film cut-
ter; quick change bayonet
lens mount. **USED 67⁵⁰**
When new,
sold for \$200.



FAMOUS GERMAN CONTAX S

f1.8 MEYER
PRIMOPLAN
Built-in Zeiss pri-
ma-mascope finder with
speeds to 1/1000.
Self timer; inter-
changeable lenses
Flash synchro shut-
ter. **USED 59⁵⁰**
Sold for as high as
\$350 when new.
Case 6.50.



**TWICE THE SPEED FOR
THE PRICE**

FAMOUS GERMAN 240mm
f4.5 ENHALT
Speed Telephoto lens for
ALL single lens reflex.
Click stop diaphragm.
f4.5 to f32 Black Anio-
dyzed mount. **69⁰⁰**
Specify
camera



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Time payments with purchases of \$10.00 or more
at 6.9% M.T. Prices listed are not set, and do
not include applicable taxes.

MODERN PHOTOGRAPHY

Silver Screen SLIDE TRAY CASE

Thanks to Spiratone's combining the facilities of a well-known projection screen with a famous case manufacturer, a dual purpose slide-tray storage case can be yours for half the cost of a regular case (when bought with trays or magazines). The luxurious two-tone leatherette-covered case holds 12 trays or magazines. The hinged cover is removable and contains a genuine silver screen, made of the material used in \$40.00 units. Use for daylight or for small group projection, with amazing brilliance, \$10.85.

DETACHABLE

Aireiquipt MAGAZINES WITH COVERS

2 for \$3.30 12 for \$18.95 SH. Wts. 4 & 6 lbs.

OFFER A-8 SILVER: 8 Aireiquipt Magazines in silverscreen case. Shpg. Wt. 8 lbs. **\$14.22**

OFFER A-12 SILVER: 12 Aireiquipt Magazines in silverscreen case. Shpg. Wt. 12 lbs. **\$24.22**

SLIDE TRAYS for TDC, B & H

VIEWLEX, KEYSTONE

Extra strong plastic trays, hold 30 cardboard and glass slides, intermixed, with index. Shpg. Wts. 3, 7, 12, 30 lbs.

In lots of 120 4 for \$1.95 12 for \$4.98 48 for \$17.95 120 for \$36.00

OFFER TDC-12 SILVER: 12 trays in silverscreen case. Shpg. Wt. 8 lbs. **\$8.22**

Sturdy carry case for 12 (Illustrated below) only 50c extra

SLIDE TRAYS for REVERE

Sturdy trays, hold 30 cardboard and glass slides, intermixed, with index.

12 in carry case **\$8.95**

OFFER R-12 SILVER: 12 in silverscreen case. Shpg. Wt. 6 lbs. **\$14.22**

REVERE 800 SPECIAL: Remote Control 18 lb. Release plus 12 trays in Carry Case **\$12.48**. In deluxe storage case **\$16.80**

35mm ANSCOCHROME 98c

Daylight ASA 32 fresh stock, reloaded in metal cartridges.

ea. \$1.44, 3 for \$4.80, 9 for \$16.80, 18 for \$17.84. Shpg. Chgs., ea. 5c

COILED 5 ft. CORD

For BOUNCE effects, to get sidelighting, to get flash closer to subject, heavy duty Cord has polarized household-type plug on one end (for Heiland, FR, Maccabitz, Ultralite etc.) and its Conquer, Promitor, ASA, Argus, Solenoid, Fractis, Ektalite, Polaroid on other end.

Same, but for Rollei Lock, Nikon, Canon, Leica, new Kodaks. **\$2.25**

Coiled Extension Cord, Model PC-PC (includes any PC cord) **2.30**

Model C3-C3 (for Argus C3 & C3 gun) 1.98, Model C4-C4 (for Argus C4, C44 and gun), Model K0-K0 (for Kodak camera and gun) 2.88

Sh. Chg. 10c. Name gun, camera when ordering.

3 UNIT REFLECTOR OUTFIT \$5.99

• Two aluminum 18" reflectors for #1 or #2 bulbs

• One bulb reflector for spot effects

All three complete with swivel joint, switch, socket, clamp and cord... at a fraction of their usual cost.

SUGGESTION: 2 #2, 1 #1 photoflood bulbs 90c.

Sturdy 3 sec. metal PHOTOFLOOD STAND, with swivel crossbar, holds two reflectors **\$3.98**

COMPLETE 18 PC. OUTFIT NO-PA. contains 3 reflector outfit, stand, lamps, all as described **\$10.67**

Shipping, Weights, reflectors 7 lbs., stand 4 lbs.

WANT A MULTIPLE OUTLET? Ask for Circular 11.

Write for your Spiratone money saving PACKET, containing hundreds of exciting accessory offers. Send only 5c—the back on first purchase. Be sure to name your camera, lens, shutter!

AT LAST! Matching TELEPHOTO and WIDEANGLE LENSES

More POWERFUL than ever and of the LOWEST PRICES in photographic history! Hard-coated, superior color-corrected, no affect on exposure or image, no installation. Telephoto lenses bring distant objects closer, help tell negative or slide with important subject matter. Tell negative or slide with important subject matter. Tell negative or slide with important subject matter. Tell negative or slide with important subject matter.

FOR ROLLEIFLEX, ROLLEICORD, YASHICA, RICOH, MINOLTA AUTOCORD, IKOFLEX, all models 2 1/4 and 4 x 4 cm.

Lenses come complete with bayonet adapter-filterholders, elegant tuxedo case. Each set consists of a smaller, perfectly matched viewing lens, and the taking lens—making telephoto and wideangle twinlens photography simpler and faster than ever. Model 88 lenses can also be used with 35mm, Polaroid cameras by means of Series VI adapter, accept standard filters.

For 4 x 4 cameras: Telephoto or Wideangle Lens **\$14.95**

Set "A" **\$14.95**

Combi. Set, all four lenses **\$79.95**

Sh. Chg. each lens set 35c, both sets 75c

FOR 4 x 4 cameras: Telephoto or Wideangle Lens \$14.95

Set "A" \$14.95

Combi. Set, all four lenses \$79.95

Sh. Chg. each lens set 35c, both sets 75c

FOR 4 x 4 cameras: Telephoto or Wideangle Lens \$14.95

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FOR 4 x 4 cameras: Telephoto or Wideangle Lens \$14.95

Set "A" \$14.95

Combi. Set, all four lenses \$79.95

Sh. Chg. each lens set 35c, both sets 75c

BOUNCE FLASH \$4.44

Right: for less than the cost of an ordinary flashgun, Spiratone offers you a unit with all these features: 13 blade fan reflector; swivel for complete bounce effect; DC capacitor; built-in bulb-battery testbutton; extension outlet, head removable for use as extension flash! Standard flashcord. Fits acc. clip or bracket.

Available accessories: Long-lasting DC battery \$1.80. Bracket, for use on side of camera \$1.80. Synchronizer for old camera \$2.75. Extension Flashgun \$4.95. C-Clamp and extension cord (makes bounce gun into ext. flash) \$2.25. Sh. Chg. 25c

Luxurious leather case 90c. Twinlens Bayonet Flash Holder \$1.98.

ONE OF THE MOST IMPORTANT TOOLS OF ANY PHOTOGRAPHER CHANGING BAG

Double zippered inner and outer bag—made of the finest cloth—100% light proof even in brightest sunlight. Whether for use in an emergency, with a film torn or pulled off the spool in a 35mm camera, or for reloading cut film holders or for developing film when no darkroom is available—the changing bag is justly referred to as a "portable darkroom". 17" x 16" working space plus elastic sleeves.

Professional Model: 27x30" working space. Sh. Chg. 60c **\$6.95**

Extra Large Model: 30x44" working space. Sh. Chg. 90c **\$8.95**

Shipping Charge 40c **\$3.95**

SYNCH YOUR OLD CAMERA

• Fully adjustable mechanical tripper, requires no installation, works through standard cable release socket of most old cameras. Has fitting for standard flash cord.

• Allows adjustment for flash bulbs and zero (X) delay for Strobes. Leather Case 19c extra

Tripper with famous make **\$4.94** Sh. Chg. 25c

Fan Flash, with ejector **\$4.94** Bracket \$1; Leather Case 75c

ACCESSORIES for your

Cid. Screw-in Filters, yellow, green, red, 1A, 85C, 82A, 80B **\$2.20**

+2, +3, diffuser, ea. **\$2.20**

Aux. Telephoto or Wideangle Lens, with Leather case, adapter **\$2.20**

Rapid Wind, requires no installation **\$3.80**

Set of coated Aux. lens and wide-angle lenses in dbl. leather case **\$4.95**

Write for free booklet "Complete Your Camera's Needs". We'll send you a copy, stating which model Camera you have.

Add for shipping costs

POCKET TRIPOD

To make room for our new models, we are closing out our most popular 8-section tripod, the ELSP, at the unbelievably low price of \$6.55. 8 sec. (10 1/4"), 7" rise elevator to 52" height, ribbed top sec., brass legs, single action pan-tilt, wonderfully portable, well suited for 35mm, 8mm, twinlens.

Leather Case 90c Shpg. Wt. 3 lbs.

50% OFF

Model EL-EP **\$6.55** INCLUDING PANHEAD

Duplicate your 2x2" Color Slides **\$19.95**

with your own camera

Sensational new Slide duplicator Series VI adapter ring lens stop-up ring. If your camera uses Series VI, requires no focusing, no composing—just insert slide and expose on color film of your choice! DUPLICATORS Model II, for Leica, Canon, Exakta, Praktica, Pentacord, etc., fit directly into camera body, have own complete 1:1 optical system. (Leica M3 model \$5.00 extra).

Name camera when ordering.

Bring Your 35mm Camera Up-to-Date with a **LIFE-SIZE FINDER \$3.95**

Enjoy the most important benefit incorporated into 1950 camera models, with your old 35mm camera—a brilliant, life-size finder, with parallax-correction to 3 1/4 ft. Its standard accessory clip.

UNIVERSAL LIFE-SIZE FINDER, with 35, 50, 90mm or max. **\$4.95**

tele and w.a. fields, and par. corr.

20 FOOT REMOTE SHUTTER RELEASE

Nothing like it for less than double! Gently actuating through pressure. Vinyl hose, chrome cylinder, valve and head connector to fit virtually any camera **\$3.98**

30 FT. MODEL \$4.90, LEICA, YASHICA MODEL 25c EXTRA

Shipping Charge 50c

FOR TWIN LENS Reflex Cameras

2 1/4 SQ. NEGATIVE ALBUM holds 100 negatives or transparencies

with your order for \$3.95 worth or more, merchandise 1 to a customer **\$2.50**

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FOR TWIN LENS Reflex Cameras

2 1/4 SQ. NEGATIVE ALBUM holds 100 negatives or transparencies

with your order for \$3.95 worth or more, merchandise 1 to a customer **\$2.50**

FOR THE TWIN LENS REFLEX FAN

Rolleiflex, Ciro-flex, IKOFLEX, RICOH FLEX, Yashica, Graflex 22, Minolta AUTOCORD

MAGNIFYING HOOD \$2.95

FOR ALL TWIN LENS REFLEX CAMERAS

Twin magnifier makes possible accurate focusing and composing of entire groundglass image with BOTH eyes and at comfortable distance, while protecting groundglass from glare. Saves eyestrain, helps accuracy, dim light focusing. Instantly removable and collapsible. For Rollex, Yashica, all others

COMBINATION OFFERS

Magnifying Hood plus Deluxe Fieldlens **\$4.95**

Magnifying Hood plus split-image rangefinder **\$4.95**

45% off list

De Luxe FIELD LENS \$2.49

A SENSATIONAL SPIRATONE EXCLUSIVE WORTH 2 TIMES AS MUCH

50% off list

WITH CLEAR CENTERSPOT FOR EASY FOCUSING

A flat thin Fresnel ring plate which fits over groundglass in your reflex camera, greatly increasing brilliance of viewing image, making the often almost invisibly dark corner image ten times brighter! Its installation—just drop! Fits into any groundglass. Perfect! For Rollei, Graflex, for Ciroflex, Yashica, Minolta, all others

35MM ADAPTER FOR ALL TWIN LENS REFLEX CAMERAS

Without installation, the Junior Minidapter enables you to use 35mm film in your 120 Rollei, Ciroflex, Graflex, 22, Minolta, etc. —yet, you can change back to your regular size any time you wish. Minidapter comes complete with groundglass mask, 35mm slide adapter, counter, ready for use. Shpg. Chgs. 15c **\$3.95**

50c MINIDAPTER has additional finder for vertical and horizontal shots, special bracket for finder and counter. **\$5.95**

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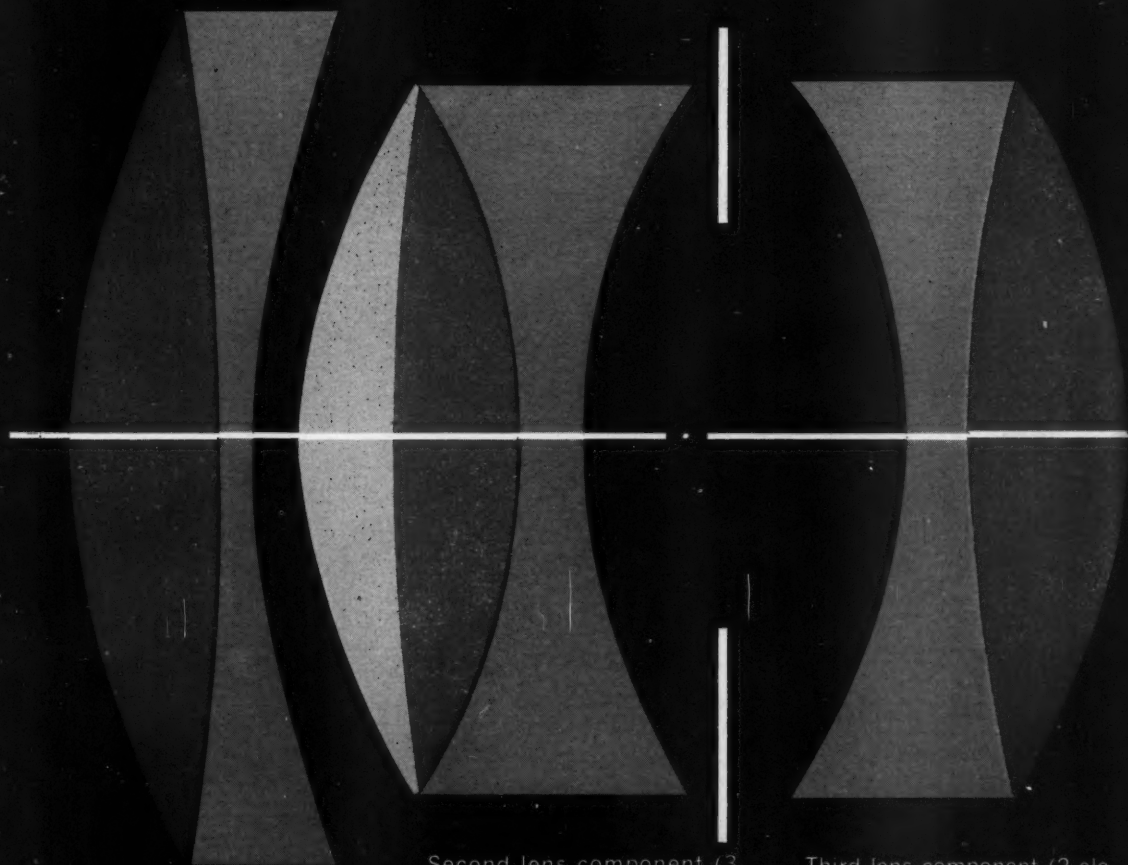
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holds 100 negatives or transparencies

with your order for \$3.95 worth or more, merchandise 1 to a customer **\$2.50**

THE INSIDE STORY ON LENSES

TYPICAL SUPER HIGH SPEED LENS FOR 35MM CAMERAS

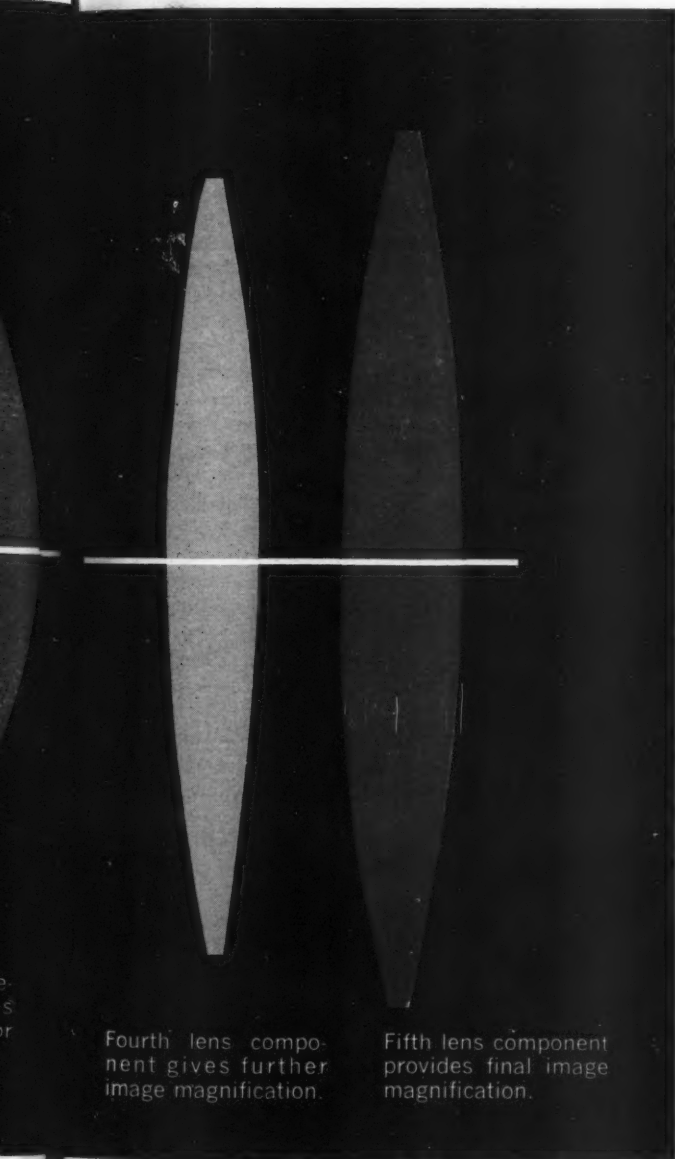


First lens component (2 elements) supplies initial image magnification and some color correction.

Second lens component (3 elements) corrects many lens aberrations (defects)

Third lens component (2 elements) corrects other lens aberrations and most color aberrations.

**TIRED OF LENS GOBBLEDYGOOK?
BENNETT SHERMAN EXPLAINS WHAT
MAKES YOUR LENS AND OTHER
LENSES WORK. AND THE WHOLE
STORY'S IN SIMPLE, EASY-TO-UNDER-
STAND WORDS AND DIAGRAMS.**



WHY ARE SOME LENSES sharper than others? Why are some faster? What are the problems lens designers are facing? How are they overcoming them? The answers to these questions aren't so complicated that they are beyond the comprehension of the average photographer. Is the lens diagram *at left* and the explanation of what each component does clear? Just as a doctor can explain in everyday words what is physically wrong with you (if he has a mind to), we can do the same thing with lenses.

Let's start easily—with no glass lens at all. Optical scientists have defined the ideal lens in fairly sophisticated ways. However, the simplest lens—the pinhole—can also be considered a sort of ideal. On a bright day, take a shirt cardboard, put a small hole in the center of it with a needle and place the cardboard against a windowpane. Darken the room. Place a white card inches from the hole and you'll see on the card an inverted and reversed image of the outdoor scene (illustration, *top left, page 47*). If you move the card toward or away from the pinhole, the image grows smaller or larger but the picture stays at approximately the same sharpness. For every point of light on the object, the pinhole (lens) forms a corresponding point on the film. Each point on the film is in the correct position with respect to the other points. As you can see, this actually describes the forming of the shape of any projected image. The practical trouble with the pinhole, aside from the fact that only a very small amount of light reaches the film, is that there is no one actual plane of focus.

However, the size (aperture) of the pinhole *does* affect the sharpness of the image. The reason is simple enough: Every object reflects light. Part of this reflected light travels in a straight path through the pinhole to land on the white card where the eye sees it as part of the image. Since the pinhole is not microscopically small, the light coming from the object point passes through the pinhole as a very thin cone and forms a small patch of light, or part of the image, on the card. The size of this patch is determined by the size of the pinhole and the distance from the pinhole to the image. If you make a smaller pinhole, the image will become dimmer, but sharper. There is a point of no return, however; if the pinhole is made too small, the image does not become sharper.

This limit of sharpness (common at a small aperture in all lenses) is caused by a fundamental effect called diffraction. While many talk about diffraction and simply take for granted that it's complicated, there are simple explanations of why it occurs. Let's take a minute to dig into it. While we have said that the light goes through the pinhole in the form of rays, according to a current theory light is believed to move through space as waves. Most lens engineers use the term "light ray" instead of "light wave" since it's more convenient to describe and follow the path of a theoretically straight line as compared to a wave. (Here, we use the term "light wave"; later we'll refer to this wave as a light ray.) While the light waves go through space or the air, they move undisturbed (*Continued on next page*)

and smoothly. But when the light waves pass through a small hole (aperture) something happens to them. They start to spread out slightly. This spreading causes the light to blur on the white card (which has been placed beyond the pinhole). This blur is larger than the size of the hole. Now, if a suitably shaped piece of glass (lens) were placed at the pinhole position, the image formed from the object would also be affected by this same spreading. In addition to this spreading, there is a further diffusing effect caused by certain parts of the single light wave interfering with other parts when it has reached the image formed by the lens. As a result of the spreading and interference, diffraction, the image consists of small points of light, each surrounded by faint rings. The sizes of the points and the rings are determined by the size hole (or aperture) at the lens. As the lens opening gets smaller, diffraction increases. Finally you reach a point where diffraction becomes so great that you can't achieve further sharpness by making the lens opening smaller. This turning point is called the "diffraction limit." At present it is believed that this diffraction limit cannot be improved; it is an absolute final barrier to the lens designer. (As we'll note later, the diffraction limit of sharpness is seldom even approached in extremely good camera lenses.)

Well, back to the pinhole. If the pinhole is made larger, the image will get brighter and, of course, less sharp. That is, the light from each point on the subject is spread into a larger patch of light in the image. Now,

if a very thin, small, convex lens is placed just behind the larger pinhole, the situation changes somewhat. If the white card is moved back and forth, a point can be found at which the image is focused with reasonable sharpness, and if the hole (aperture) can be made larger, (making the lens "faster") the picture will become brighter. But when the hole in front of the thin lens reaches a diameter of about 1/20th of the distance from the lens to the cardboard (or from the lens to the film in a camera) picture sharpness will begin to diminish. This will first be noticed at the corners and edges of the picture. The largest opening of the lens is determined by the optical imperfections of the simple lens itself. These imperfections are called lens aberrations. Every simple lens with a "normal" angle of view has aberrations which cause the light points forming the image to blur.

A lens of high quality will produce an image point of light from each object point, which is much smaller and sharper, than that produced by a simple lens. The best modern lenses can produce image light points which are less than 1/1000th of an inch in diameter. To achieve this high level of performance the lens designer has to reduce or effectively remove several kinds of aberrations. He must contend with light passing through the lens in many directions. Some of these directional rays are pretty wild. These are called "skew rays." They cannot be predicted easily. Control of the skew rays by careful and thorough design becomes very important in lenses of very wide aperture. Actually, the lens designer needn't start from scratch every time. The basic designs found in modern 35mm camera lenses give him a good start in controlling and reducing the major aberrations.

Spherical aberration was one of the first lens flaws studied by early designers. It occurs because the light rays passing through the outer parts of the lens toward the film come to a focus at a different point than do the rays passing through the central part of the lens (illustration, *top right, page 47*). Focus errors along the axis (a theoretical line through the center of the lens to the center of the film plane) are called axial spherical aberrations. Focus errors which occur away from the center axis of the lens are called oblique spherical aberrations. By adjusting the curves of two lenses simultaneously it is possible to reduce or effectively eliminate most spherical aberration.

What is left over, due to rays passing through the lens between the center and the rim, is called *zonal spherical aberration* (illustration, *center right, page 47*). All but a very few special lenses have such residual zonal spherical aberration. This defect does not affect the performance of moderate speed lenses, but when the speed of lenses reaches $f/2$ (see Glossary, *at left*) or more, zonal spherical aberration becomes a serious problem again. Occasionally, it has been possible to add odd-shaped non-spherical surfaces or lens elements to these very fast designs to minimize or control the zonal spherical aberrations. These aspheric elements must be produced singly, hence they are costly, and are used

MODERN'S GUIDE TO LENS LANGUAGE

GLASS: a substance, basically made from a mixture of silicates, which has the property of altering light rays directed through it.

ELEMENT: a piece of glass within a lens.

COMPONENT: one or more elements either apart or cemented together, but acting together as a part of a lens.

LENS: one or more elements acting together, which placed at a suitable distance from a film plane, will focus light rays from a subject onto a film, thus forming an image.

POSITIVE ELEMENT: a circular piece of glass, with the center thicker than the edges (convex), which collects light rays and focuses them.

NEGATIVE ELEMENT: a circular piece of glass, with the center thinner than the edges (concave), which collects light rays and spreads them out.

CONVEX: same as positive element.

CONCAVE: same as negative element.

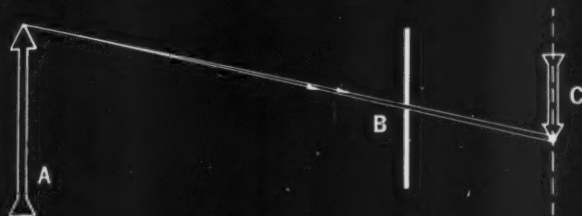
SYMMETRICAL LENS: a lens in which the elements or components in the front half are of similar construction to those in the rear half.

FILM PLANE: exact position within a camera body, where film must be placed to form a sharp image.

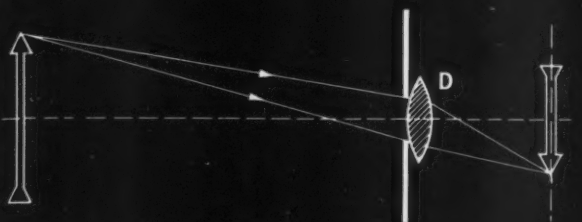
FOCAL POINT: the position where a sharp image point is formed on the film plane by light rays from a point object at infinity.

IT ALL BEGAN WITH A PINHOLE

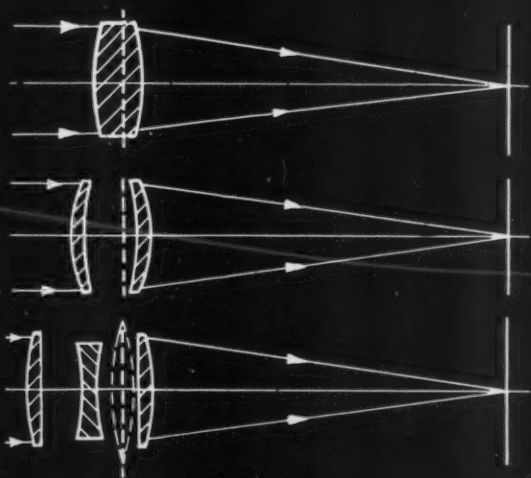
Long before anyone ever heard of Daguerre or photography, people noticed that a bright outdoor scene might cast an inverted image onto an interior wall—if light entered through a small hole in side of building.



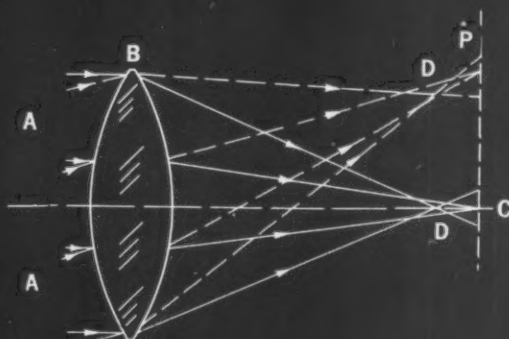
CRADLE DAYS: If your subject is an arrow (A), the light rays pass through pinhole (B) and form recognizable, but unsharp image (C).



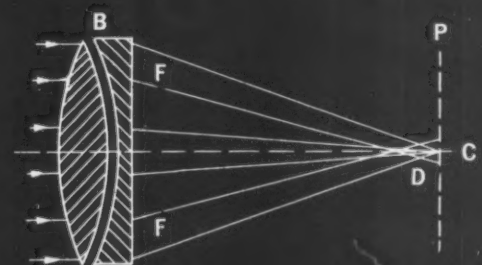
FIRST GIANT STEP: A convex lens (D) placed at the proper point near the pinhole will bring light rays closer together (focus them), thus forming a comparatively sharp image.



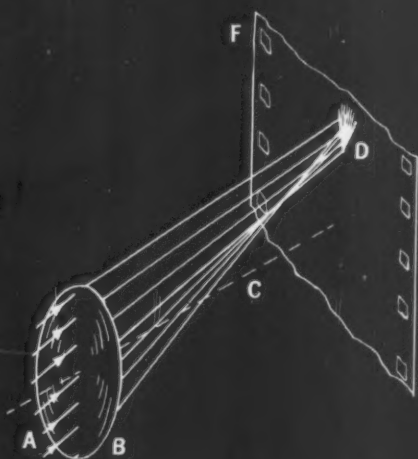
GROWING UP: Although image from a pinhole alone retains same degree of sharpness no matter what its distance from pinhole, every glass lens must be placed at a certain distance (its focal length) from film in order to focus image of a distant object. (The greater the focal length the bigger the image.) This lens position is measured from the principal plane—which may be located within an element, between elements or even outside lens. In the three lens drawings above principal planes are indicated by dotted vertical lines.



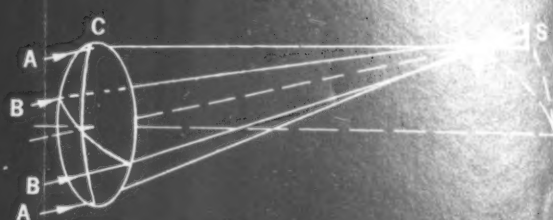
SPHERICAL ABERRATION: Light rays (A, A) pass through lens (C). Center rays focus at (D) on film plane (P). But edge rays, which must travel farther to film plane, focus in front of (D) and spread out. Result: horizontally unsharp image.



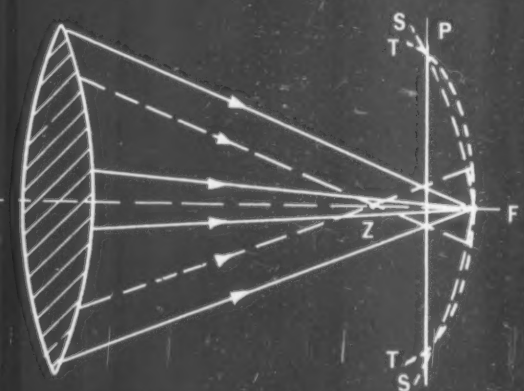
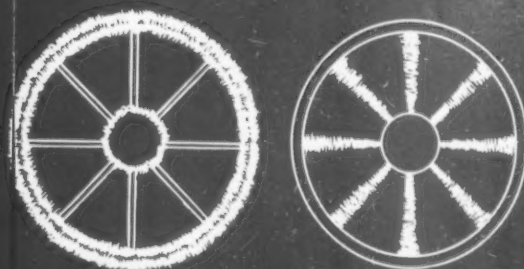
COMA ABERRATION: By adding distortion to focus (D), when all center rays are focused in focus (D) same point (D), the uncentered rays focus into multiple points (D, D) along a point (D). Thus, when unsharpness remains.



CHROMATIC ABERRATION: By adding distortion to focus (D), when all center rays are focused in focus (D) same point (D), the uncentered rays focus into multiple points (D, D) along a point (D). Thus, when unsharpness remains.



ASTIGMATISM: Light rays (A, A) come from vertical line; rays (B, B) come from horizontal. Vertical line rays (A, A) pass through lens (C), focus at (D) and spread out at (S). Horizontal rays (B, B) pass through lens (C), focus at (S). Effect, below: at left, hub and rim of wheel are unsharp, spokes sharp (radial astigmatism). At right, rim and hub are sharp, spokes unsharp (tangential astigmatism).



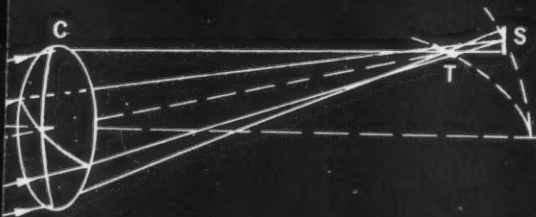
CHROMATIC ABERRATION: By adding distortion to focus (D), when all center rays are focused in focus (D) same point (D), the uncentered rays focus into multiple points (D, D) along a point (D). Thus, when unsharpness remains.

THOUGH I, THOUGH, AND GLASS TO

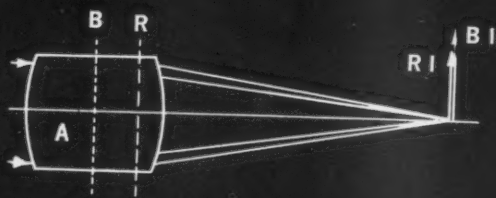
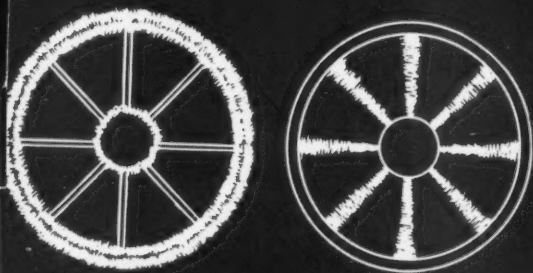
While glass is a material of choice for the optical designer, it is not without its problems. The most common of these is chromatic aberration, the color fringing that occurs when light of different wavelengths is focused at different points.

PINHOLE & SOME HORRIBLE THINGS OF

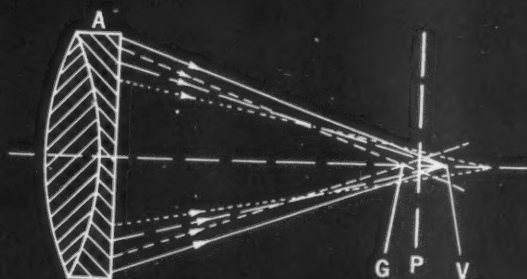
Optical designers wish, if any optical problem, one distortion, and number of elements likely will be created. In attempting to eliminate one distortion, they may cause others to appear. Precisely what any lens designer's brow will be created.



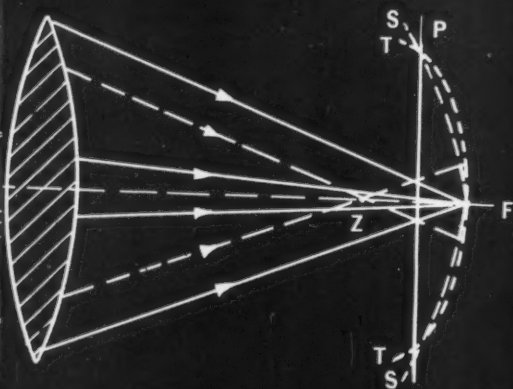
ASTIGMATISM: Light rays (A, A) come from vertical line; rays (B, B) come from horizontal. Vertical line rays (A, A) pass through lens (C), focus at (T) and spread out at (S). Horizontal rays (B, B) pass through lens (C), focus at (S). Effect, below: at left, hub and rim of wheel are unsharp, spokes sharp (sagittal astigmatism). At right, rim and hub are sharp, spokes unsharp (tangential astigmatism).



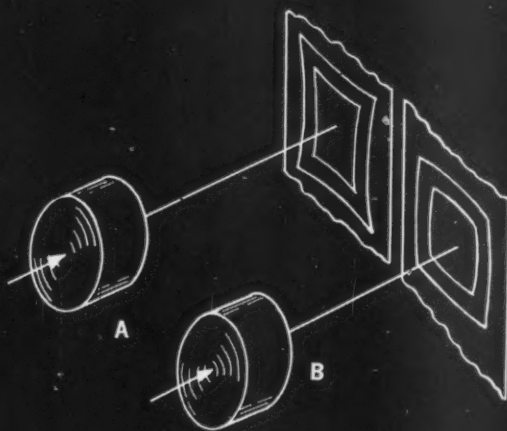
LATERAL COLOR ABERRATION: Lens (A) brings red and blue rays to common focus. But principal plane of red rays (R) is in back of that of blue (B). Thus effective focal length changes with color, and image in blue light (B1) is larger than image in red (R1). Result: Images of different size destroy sharpness.



SECONDARY COLOR ABERRATION: Lens (A) focuses red and blue rays at same point on focal plane (P). But green focusing at (G) and violet at (V) are recorded unsharply.



OBTAINING A COMPROMISE: By shifting focus so film plane (P) is slightly in front of axial focal point (F), but beyond zonal focal point (Z), designers achieve best compromise performance when zonal spherical aberration and astigmatism are present. Curved astigmatic focal surfaces, sagittal (S) and tangential (T) intersect near picture area edge.



BARREL AND PINCUSHION DISTORTIONS: When photographing a square object, lens causes straight line to bend inwards, pincushion, (A). Another distortion occurs when line bends out, barrel effect, (B).

PINHOLE & SOME HORRIBLE THINGS OCCUR WHICH MUST BE CORRECTED

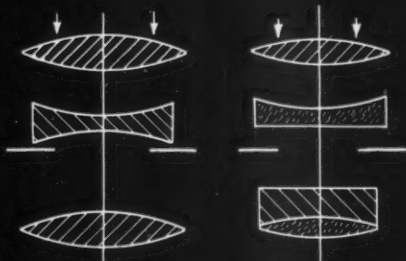
As designers wish, if any optical problem, lens distortions. And number of elements usually will be created.

In attempting to eliminate or minimize some aberrations, the designer may cause others to appear or worsen already existing ones. Thus optical engineers can work only towards a compromise—which is precisely what any lens actually is. What are the problems that furrow our designers' brows? Take a look above.

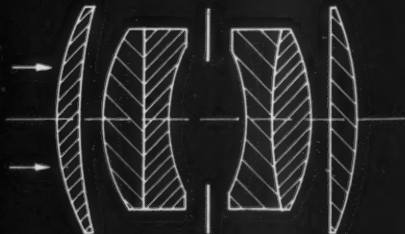


NORMAL FOCAL LENGTH LENSES: MORE SPEED NEEDS MORE GLASS

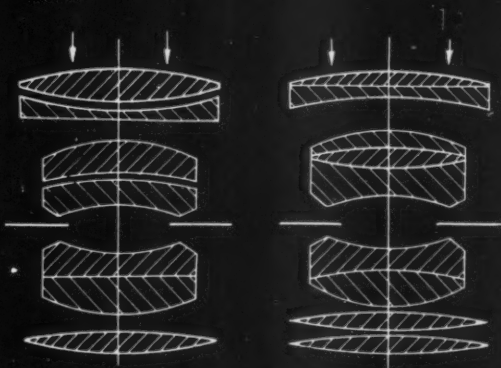
For many years the three-element (triplet) lens was a standard of excellence. Really good, sharp pictures could be taken with it. But the actual maximum opening was limited. The greater the opening, the softer the image. So designers added other elements. The more elements they used, the more problems they created and the more expensive lenses became. But designers got what they wanted—speed plus sharpness.



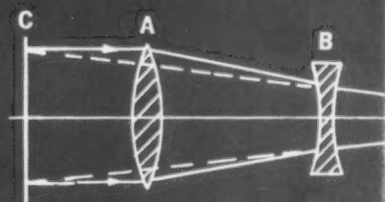
A. TRIPLET AND TESSAR: The triplet, left, can produce sharp images to an $f/4.5$ aperture. Tessar design, right, evolved from triplet, stays sharp to $f/3.5$, has less astigmatism, spherical aberration.



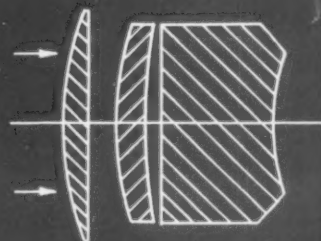
B. ADDING TWO ELEMENTS: High speed symmetrical Gauss design (here the Biotar) allows speeds to $f/2$ with passable correction. It's unsuitable for higher speeds.



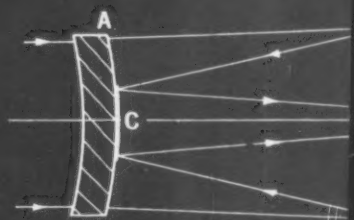
C. NOW THERE ARE NINE: By adding elements and altering Biotar formula, sharper $f/2$ lens is made, left. Two elements are added (to a total of nine), right. Speed is increased to $f/1.2$. Lens retains many corrections.



1. BASIC TRUE TELEPHOTO: Actually, only two elements, convex (A) and concave (B), depends on their size and relationship. (Berthaus use just two elements.) However, with a two-element tele, in true tele lens is in the air in front of lens.



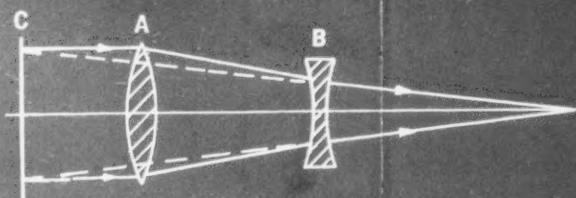
2. FOR FASTER TELEPHOTOS: By using the tele's speed is increased. Thick near corrects much astigmatism, distortion.



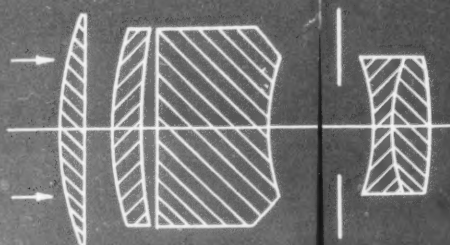
3. THEN ON TO MIRRORS: Mirror telephoto reflecting telescopes. Rays enter the lens, bounce off mirror (B), to smaller mirror through element (C). Folding of light to build a lens of great focal length in.

WHEN LENSES AREN'T N RARE EARTH GLASS & M

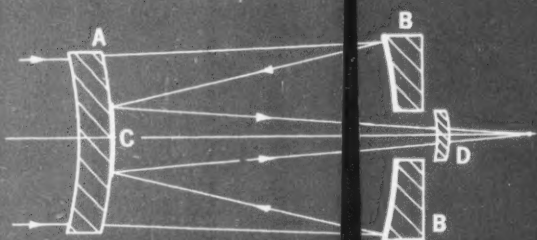
In days of yore, when someone wanted to see which would bring distant scenes closer, he chose a lens of great focal length in a tube the length of a stove. When he desired to get additional detail, he could use a short focal length lens, but it not always produce a uniformly sharp



1. BASIC TRUE TELEPHOTO: Actually, a true tele lens needs only two elements, convex (A) and concave (B). Focal length depends on their size and relationship. (Some of today's Big Berthas use just two elements.) However, you can't get speed with a two-element tele. In true tele lens, principal plane (C) is in the air in front of lens.



2. FOR FASTER TELEPHOTOS: By using five elements or more, the tele's speed is increased. Thick negative element, center, corrects much astigmatism, distortion.

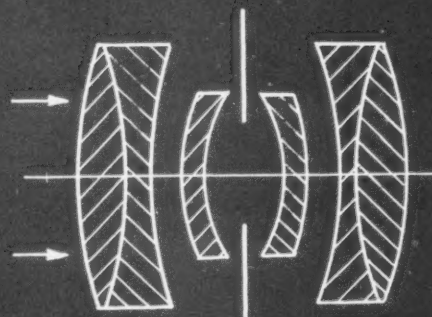


3. THEN ON TO MIRRORS: Mirror telephotos work like giant reflecting telescopes. Rays enter the correcting element (A), bounce off mirror (B), to smaller mirror (C), then reflect through element (D). Folding of light rays makes it possible to build a lens of great focal length in a relatively short tube.

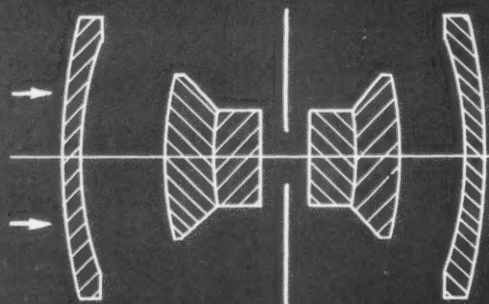
WHEN LENSES AREN'T NORMAL: RARE EARTH GLASS & MIRRORS

In days of yore, when someone wanted a lens which would bring distant scenes closer, he chose a lens of great focal length mounted in a tube the length of a stovepipe. And when he desired to get additional area into his picture without backing off the cliff, he could use a short focal length lens which did not always produce a uniformly sharp image.

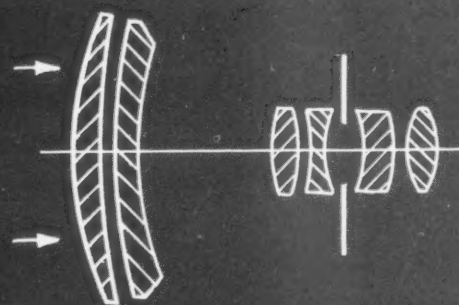
Problems: the long lenses were too large and heavy, and the short lenses could not be made faster without increasing the aberrations and distortion. Also, these short lenses could not be used in single-lens reflexes. But today's lens designer extends the limits of design by the use of new materials and tools—rare earth glass and even mirrors. He breaks through the lens speed barrier with designs of fantastically large aperture and comparatively excellent sharpness, and also with lenses covering extremely wide angles.



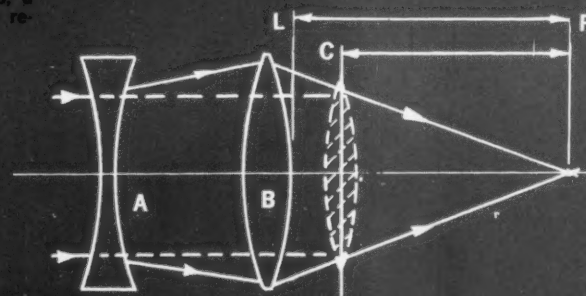
4. TYPICAL SYMMETRICAL WIDE-ANGLE LENS: It's low in distortion, but also low in speed. Generally this wide-angle design can't be used in a reflex camera because the rear lens element must be close to the film plane.



5. AND THINGS ARE GETTING EVEN WIDER: For instance, this super wide-angle lens (Super-Angulon) covers an extreme angle of view with relatively low distortion at all apertures. Although largest opening is generally $f/8$, a 21mm $f/4$ lens for 35mm cameras was recently introduced.



6. WIDE-ANGLES FOR REFLEXES: Retrofocus principle solves the single-lens reflex problem. It permits wider apertures and shorter effective focal lengths with comparatively great lens-to-film distance. But, lenses of this design often have barrel distortion.



7. HOW THE RETROFOCUS WORKS: This design utilizes basic lens components (A) and (B) to produce short effective focal length at extended lens-to-film plane distance (L to P), allowing room for mirror action. Principal plane (C) indicates where conventional wide-angle lens would have to be placed if design weren't retrofocus.

only in special design problems. The Elgeet Optical Co. has used aspherics in some of its movie camera lenses.

Astigmatism is the main aberration limiting the performance of the modern camera lens (illustration, *top left, page 48*). It's most evident when photographing objects such as a spoked wheel. Astigmatism causes the rim of the wheel to focus at one point and the spokes to become sharp at still another. Where lines are sharp pointing toward the center of the picture (such as the wheel spokes) but circles or rings are unsharp (such as the hub or rim of a wheel) we have what's known as *sagittal* astigmatism. When the lines are sharp in a ring around the center of the picture and the lines pointing centerward are unsharp, the aberration is called *tangential* astigmatism. If we mark the exact focus settings and the two different focal positions for the two types of astigmatism on a chart, we would see that the two aberrations cause the lens to form focus on two separate planes. In good lenses, these two focal surfaces do meet in an arc intersected at two points by the film plane (illustration, *bottom left, page 48*). This is the only zone in the picture area where there is no astigmatism. The greatest distance between the two focusing positions in the other parts of the picture area is the degree of astigmatism remaining. Lenses of three-element (triplet) design generally have greater regions of astigmatism than four-element designs such as the Tessar. Astigmatism is almost impossible to eliminate completely. But, by careful choice of the lens elements, their surface curves and spacings, the lens engineer can greatly reduce the astigmatism.

Coma is a very common aberration in lenses (illustration, *bottom right, page 47*). We've seen how points of an image are recorded as similar points on film. However, when rays reach the film from an object point away from the main central axis of a lens, they do not meet at a common image point on the film. Each ray forms a roughly circular image. Since these rays from the same image point pass through different zones of the lens, they are not all of the same focal length. And thus, each rough circle formed by a ray is of a slightly different size. The image point on the film, instead of being just a point, becomes a series of overlapping oblate circles from small to big, producing the characteristic cone-shaped blur known as coma. However, by making adjustments to the surfaces of two or more elements together, coma aberration can be reduced and sometimes eliminated completely.

While spherical aberration, astigmatism and coma result from the inability of a lens to register image points of light accurately on the film plane, lenses suffer from another set of aberrations caused by the sad fact that all light is not just one color but actually a mixture of many colors. Thus, this second series of aberrations concerns the problems of registering each color ray at the right place.

To understand *lateral color aberration* we must examine a fundamental characteristic of all lenses called the principal plane. Simply described it is this: If the complex modern lens could be replaced by a single thin lens of the same focal length, producing the same image

size, it would have to be placed in a certain location to perform the duties of the complex lens (illustration, *bottom left, page 47*). This location is called the principal plane.

The principal plane is an imaginary position where theoretically all the focusing power of the camera lens appears to be concentrated. However, in the actual complex lens the focusing power is distributed among several elements. Nevertheless, this imaginary principal plane is important. Suppose red and blue rays in a particular lens are brought to a single focus. If the principal planes for red and blue light are not in the same place (illustration, *top right, page 48*), the camera lens produces slightly different image sizes for each of the two colors. At the center of the picture, this might not be noticed, but at image points away from the center, the red and blue images would be of different sizes. Street light images near the edge of the picture, for example, might have red and blue color fringes. This serious aberration is called "lateral color." Usually, the designer can cut this error down by, surprisingly, allowing some color error to remain at the center of the lens. By properly balancing the other aberrations, high overall performance in color over the picture area can be obtained.

Secondary color aberration was fairly unimportant years ago. When photography first became popular, the only sensitive black-and-white materials available were blind to all colors except blue and green. Red and yellow had no effect. This meant that lens designers worried only about making violet, blue and green light rays come to a common focus on the film. More recently, however, panchromatic and color films have increased the range of colors which must be controlled. For these newer films, it is necessary to bring red and blue to the common focus. If the green and violet light do not come to the same focus along the axis of the lens, color fringes form around the images on the film plane causing unsharpness. This is "secondary color aberration" (illustration, *center right, page 48*).

Thus, all of the design and manipulation of the lens curves must be done with two or more different colors in mind. This corrective work seriously affects the aberrations already described. If you look back at the three aberrations described before and multiply them by the number of the colors you'll have an idea of the complexity of the modern lens. Lenses which have been designed for high performance in three colors are called "apochromatic" lenses. However, there is some dispute concerning the exact point at which sufficient corrections have been made to label the lens as an "apochromat."

The progress of lens designs, and of the optical engineer's ability to conquer aberrations, have been closely paralleled by improvements in the basic ingredient: glass.

Basic to the whole principle of lens design is the fact that when light passes through a suitable curved piece of glass, the rays are refracted (bent). The degree to which the rays can be bent profitably depends on the composition of the glass. (Continued on page 90)

WHAT DOES WM. KLEIN DO?

**SATIRE
FASHION
DESIGN
HUMOR
EXPERI-
MENT
MOVIES
ABSTRACT
DOCUMEN-
TARY**





WHEN YOU OPEN William Klein's picture book *New York*, the demons leap out at you. Street urchins blast directly at your head with cap pistols (picture at right), two teen-agers proudly display a giant poster of Marlon Brando torn from a theatrical display, fantastic jumbles of street signs verbally contradict each other, photographs of newspaper ads have blurbs of copy emanating from people's mouths, wild blurs are children. Most of the pictures exhibit the most atrocious graininess and lack of tonal gradation. Quality could not conceivably have suffered more if the negative had been massaged with sandpaper. Yet the book as an entity indicates the emergence of a positive vital photographic personality. It is the personality's individual impressions of the city—dirt, smog, tumult. "Where's Fifth Avenue?" inquired one viewer. For Klein it wasn't, and isn't.

What has prevented Klein's documentary photographs from landing in the nearest waste basket? A study of the pictures on these two pages plus the frantically magnificent group picture (on the two preceding pages) made in a New York children's playground explains better than words. Klein has a photographic eye quite similar to that of renowned photographer Henri Cartier-Bresson. Like Cartier-Bresson's, his camera closes with the subject, various images seem to arrange themselves almost as a designed ballet or poster—and at the exactly right instant, when everything jells, not before or later, the picture is made. But the subjects don't act like Cartier-Bresson's subjects. Klein's are charged with fantastic energy, hopped-up like a movie projected at triple speed. The prints' absence of tonal gradation between the white and blacks produces a series of stark, jumpy photographs which could easily require the viewer to absorb a tranquilizer or two to calm down after leafing through the book.

As the battle at MODERN raged over Klein's *New York*, someone remembered that there existed a fashion photographer named William Klein whose pictures appeared in *Vogue* magazine. Could it be the same? Probably not. The fashionable Klein was a superb technician and couldn't possibly turn out pictures with such atrocious quality.

But Klein-2 was the same Klein-1 and he did produce the New York pictures. We caught up with tall, thirtyfiveish, versatile Klein two days before he was to leave for Paris, his permanent operational base. He threw us one Pandora's box of pictures after the other—fashion, documentary, abstractions, designs, scraps of movie film plus a complete book dummy on a proposed Rome volume to follow



New York gunfighter (underage)

DOCUMENTARY: LIKE A PISTOL GOING OFF

Klein approaches his journalistic subjects at quarters so close that their proximity almost causes them to leap off the paper at the viewer. Although those reproduced here have been considerably reduced from the 11 x 14 original prints, examine the strength of the pistol-packing New Yorker *above* or the solemnity of the sculptured Roman faces *top right*. For a masterly exciting group picture, see what Klein has managed on the two preceding pages when he visited a New York playground. Klein is quick on the draw—notice his timing in the very touching photograph of the small boy saluting, *far right*, with the man behind in almost ballet stance. Klein doesn't discriminate against a blurred picture, but do the Roman women *at right* disturb you? And is the odd and diffuse lower right-hand portion of the picture real or a heavily worked-over negative or print? These pictures, made with 28 or 50mm lenses on a Leica, are from Klein's already published picture book *New York* and from his forthcoming volume, *Rome*.



Three Roman faces



Patriotic city ballet

Roman women, blurred

the *New York* book (pictures, pages 54 and 55). He departed, leaving us alone with a large collection of Kleineria—pictures, opinions and enthusiasm.

Nearly everyone seeing Klein's *New York* work immediately surmises that he is a European. Nobody, but nobody, can be entranced with and see the oddities of New York so succinctly as William Klein and be resident to Manhattan. Well, wrong again.

Klein's book is the result of a New Yorker's return to his native city after spending eight years in Europe studying painting with Fernand Leger and having exhibitions in Paris, Brussels and Milan. In Milan (1953), working on some murals, he applied photography experimentally to suggest movement of geometric forms (picture, page 57). These murals impressed Alexander Liberman, art director of *Vogue*, to such a degree when he saw them in Paris that Liberman asked Klein to New York. In 1955, landing in the U.S., Klein decided to record the revisit with a camera. Ergo, the book. The camera he used, a Leica with 50 and 28mm lenses, he bought—oddly enough—from Cartier-Bresson.

Klein had never before used a camera to document anything more serious than a weekend snapshot scene. His photographic approach to New York was unique. As an expatriate, he had been conditioned to the European scene. As an American his roots were in New York. He photographed with a stranger's interpretive eye for the unusual but with a native's ability to find it.

"My first New York documentary pictures were, at least, technically primitive," he admits. "That was all right at the time, but the definition of a primitive is that he isn't primitive deliberately." If Klein was not a deliberate primitive, he soon saw definite reasons in favor of remaining one. His documentary style has never strayed far from it.

Klein's attitude towards his documentary photographs has none of the preciousness associated with that of the high-strung sensitive photojournalist. He does not feel that his pictures are universal truths or complete statements of humanity.

"My New York documentary photographs, made during a six-month period, are a mixture of the mixed and not-so-mixed feelings my return inspired," Klein comments. "They are all personal, neither objective, nor for that matter subjective. I may be wrong about some things as I've photographed them—as far as you're concerned. As far as I'm concerned, they're right.

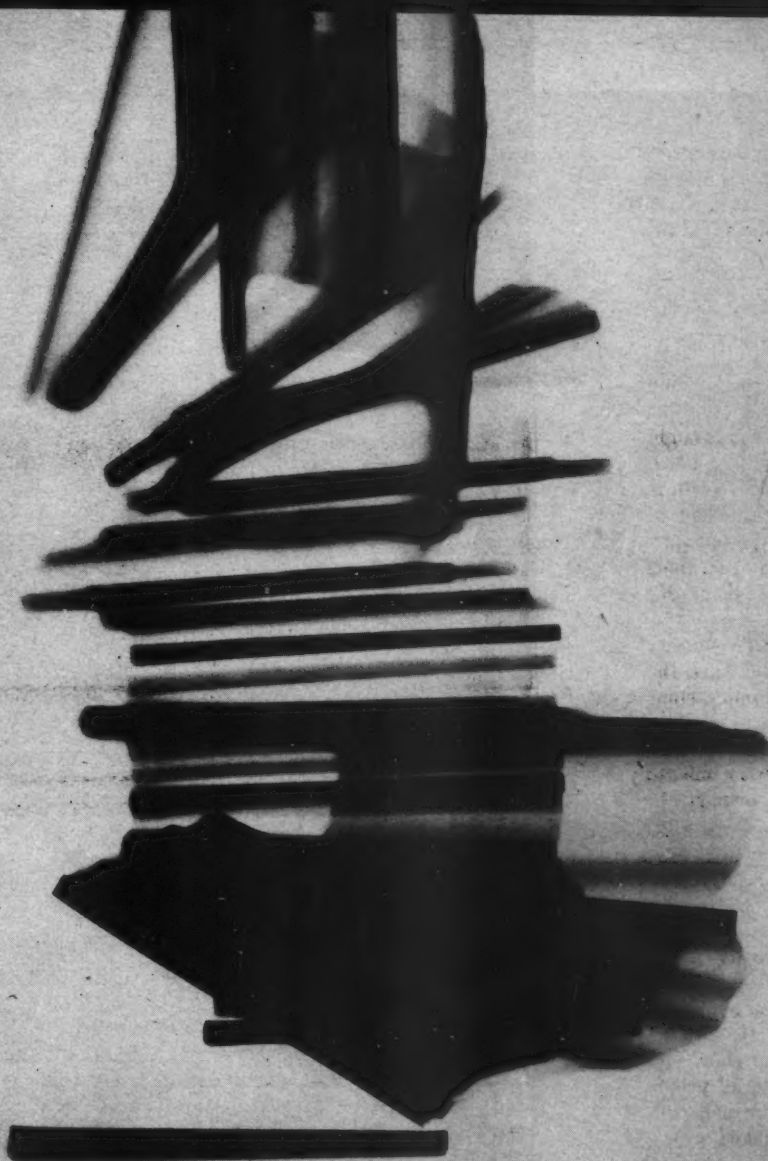
"On the other hand, I spent only three and one-half months shooting pictures for the forthcoming Rome book. I may be wrong, basically



Three memorable New York signs

SIGNS AND DESIGNS: ARE THEY PHOTOGRAPHIC?

Photographing signs, says Klein, is not strictly photography. Looking at Klein's work we are inclined to disagree. The signs represent an aspect of New York that Klein finds amusing but reprehensibly frightening. The pictures certainly rivet your attention to Klein's viewpoint. Perhaps his talent for arranging them is allied to his earlier pre-camera work in photograms (also not strictly photography?). In both instances, Klein insists that the photographic process is an aid to graphics and should thus be used. In any case, his addiction to sign language has caused MODERN's staff to see many strange, wonderful and terrible signs we had not noticed around New York before simply because we overlooked them.



It all began with
photograms

like a cigarette show



Combining the real
with the unreal

wrong about my interpretations of a lot of things. In Rome, it was a question of using my intuition with no background to the subject—not much to go on except what I saw. I was happy when many perceptive Italians told me that I did see clearly. Often I must confess, it was all just guesswork.”

Klein's New York pictures include that extremely rare element—humor. To the photographic world, where pictures of a girl's skirt being blown above her waist by a gust of wind or a man slipping on a banana peel are often considered the height of hilarity, Klein brought a new perspective. He saw humor in a small sign advertising raincoats for dogs (picture, page 56), in two girls standing in front of an enlarged cigarette advertising poster (picture, page 57) in a hopeless maze of ad signs so scrambled no one could separate them (see this month's cover).

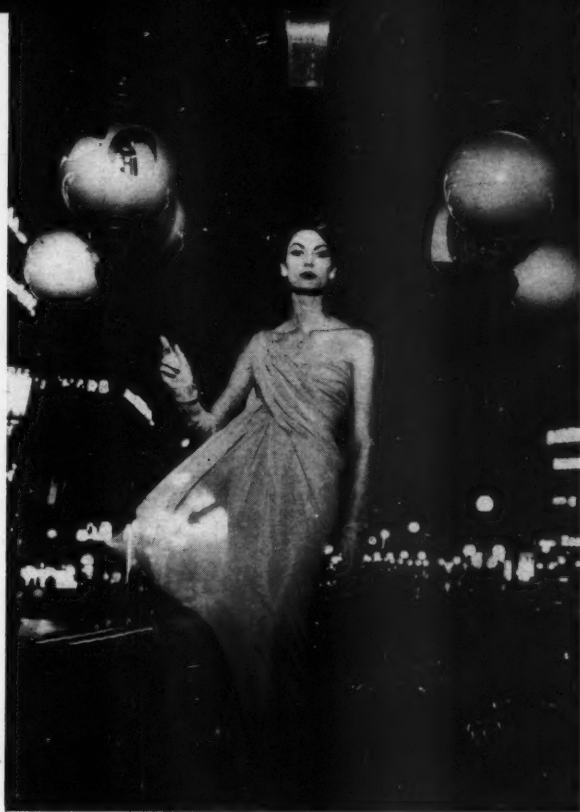
More than any specific technical virtuosity which Klein did not have, he did have the ability to see and record his own impressions of New York—the ridiculousness of the city with its unspoken wordiness. Klein: “No man's land. The streets are mined. In just a minute it will all go up or just did.” He manages to antagonize those who don't see eye-to-eye with him. His humor and social comments are well-served or outrageous, depending on just where you hang your own hat.

Actually discussing or explaining Klein's technique—his exact use of cameras, developers and how he prints—would be beside the point, since technique is the least important element of his documentary work. He uses the 28mm lens for most of his group shots and close-up work where large numbers of people are shown (such as the picture on pages 52 and 53). His other pictures are taken with a 50mm lens.

In looking over his prints, you will see much reworking and bleaching to remove or change details that displease him. The work is not done with concealment in mind—bold doctoring is more like it. In one photograph of the Roman forum ruins, the work on the print or negative is violently discernible. The sky seems a gigantic boiling thunderstorm. Eerie light plays over the ruins themselves. “I never saw the ruins that way,” we told Klein. “Strange, that's just how they always seem to me,” he replied.

While Klein stalked New York streets (1955), Cartier-Bresson camera in hand, he was simultaneously breaking into the field of fashion photography.

Now he was not to be his own boss. Here his photographs had to please editors and not merely himself. “My documentary pictures were for books I (Continued on page 96)



Ornate lamp post with svelte base

FASHION: BEAUTY MEANS A SENSE OF HUMOR

Certain attitudes towards fashion have struck Klein as having humorous possibilities. His beautiful women he insists must possess a sense of humor. Klein often applies thin coatings of amusement in adroit fashion to the situation itself. Not only does a lamp post grow from milady's head in very unphotographic fashion, *above*, but it is a lamp post to end all lamp posts. The decorous face *at right* puffs not gently on her cigarette in ladylike manner but becomes a steam cauldron—through a veil too. Klein likes to go even further “out” with his humor in fashion. “In an artificial situation, the way-outer it is, the better,” says Klein. Klein now works on mutual exchange policy between documentary and fashion photography—bringing naturalness to fashion and technique to documentary.

A decorous boiler



READY?

AIM, BUT DON'T FIRE AT THE BEACH UNTIL YOU MASTER THESE 5 KEYS TO TIMING



SHOOT FREELY, THAW THE ICE. Be willing to waste a number of frames if necessary to ease model's tension. The moments when subjects relax and reveal personality are fleeting. Watch for them. Burt Owen shot half a roll, avoided unpleasant contrasty light by having model turn head to shade. Hexacon, 58mm Biotar, Plus-X, 1/100, f/11.

DIRECT SOME OF THAT ACTION! Corn? Maybe, but it stopped you, didn't it? Don't hesitate to set up a shot. You can get subjects where you want them when you want them—and if necessary have them repeat the performance. Burt Owen used medium speed film, a good choice for bright beach illumination. Hexacon, 58mm Biotar, Plus-X, 1/100, f/11.

NO LIFE GUARDS
ON DUTY
BATHING
AT YOUR OWN RISK





BE PATIENT! WAIT FOR THE SITUATION. Awaiting the exact instant is all important when photographing the interplay between two or more people. Here, Burt Owen refrained from shooting until his wife covered her ears to shut out baby's noise. Graflex 4 x 5, 120 adapter back, 190mm Ektar, Plus-X, 1/60, f/8.

COME IN CLOSE FOR DETAILS. Wet, dripping > wet face of swimmer could have been dull if picture had been made on small negative at even a moderate distance with normal lens. However, large negative and 190mm lens rendered crisp the details of drenched skin and hair. In open shade, when girl was off guard, Burt Owen shot with 4 x 5 Graflex, 120 adapter back, 190mm Ektar, Plus-X, 1/60, f/8.

SO WHAT'S THE PROBLEM with beach pictures? Lighting? Exposure? Camera, lens, film? These fundamental technicalities can pose peculiar problems at the beach and you'll find them discussed in the captions accompanying the photographs. But as far as we're concerned, your main problem may be one of timing.

Each of the photographs in this article was approached and handled differently. Each posed different technical problems. In addition, each is an outstanding example of the importance of the photographer's sensitivity to the moment, and his ability to capture it.

The model in the photograph on page 60 was posed. Photographer Burt Owen transported her one chilly spring day to the near-empty beach at Coney Island in order to make a series of test head shots. Owen ran off half a roll of 35mm film from different angles, here having instructed her to look over her shoulder away from the sun. He opened the lens two stops wider than indicated by overall reading to compensate for shade on face and in this frame hit the right expression.

BEACH (cont.)

WANT ONE? SHOOT TEN! When you're photo-▷ graphing repetitive situations at fast shutter speeds you can't be sure of nailing the right moment with just one exposure. It's best to make several. Myles Adler made about ten of different players trying to break the line before he caught one air-borne. Contax IIa, 35mm f/2.5 Nikkor lens, Plus-X, 1/500, f/5.6.



The same beach and the same girl appear on page 61. Owen had noticed the sign when they first went on the beach. A few minutes after completing the portrait session the man in the overcoat (also a professional model) and the girl (shivering) began to clown around. Owen noticed the humorous potential in the situation of fully dressed man pursuing barely dressed girl past previously noted sign, and intentionally plotted their headlong dash to include the sign to best advantage. Actually, Owen made a series of pictures of this situation, some with and some *sans* sign, although the models went through the action only once. Owen charged after them to the seaside, stopping to shoot as he went. The depth of field of the 58mm Biotar lens set at f/8 and focused on 16 ft. kept everything from 10 ft. to 40 ft. sharp, leaving the photographer free to shoot on the wing pausing just to press the shutter release.

None of the photographs above was posed. But just as in the pictures on pages 60 and 61, a peak—of expression, action or situation—has been captured.



In the photograph of the mother and child, *opposite*, Burt Owen anticipated a situation, waited for it to develop, then shot at the most revealing moment. The camera was focused and exposure set in advance in accordance with a reflected light reading taken from the baby's face. The baby, his own, had been crying and crying for what seemed like hours while the woman, his wife, tried to doze. Owen refrained from shooting until his wife gave up in desperation and covered her ears, as the child chortled blissfully on.

The picture of the little girl, *opposite*, is an example of another shooting technique. Burt Owen used a 4 x 5 Graflex, and shot from a distance of about 4 ft. Hardly an unobtrusive setup. Owen took an incident light reading, set camera controls at $f/11$ and $1/60$ sec., and prefocused. The child was completely aware of him, and of the camera. However, a quick trigger finger substituted for invisibility. The girl was momentarily distracted by a word from her mother who was standing to Owen's left. Owen was ready—and the re-

sult was a natural, spontaneous expression, with no trace of camera consciousness.

The third photograph, of the group playing "Johnny on the pony" *above* is a classic, peak action shot. Here the photographer had no problem of waiting for a human situation to develop, or of distracting his subject's attention from the camera. But it was necessary to make several exposures (see caption). The participants were involved in the game. Myles Adler moved in, chose his framing, and set exposure at $f/5.6$ and $1/500$ sec. to insure stopping action of flying figure. He used a zone focus technique, focusing his 35mm wide-angle lens at about 8 ft. to keep foreground sharp, end of line recognizably sharp. Look for games of this sort—there are hundreds of variants from playing catch to playing leap frog. Practically all of them, if you select the right point of view, can make excellent action shots; practically all of the players will ignore you completely, or soon forget you if you linger to photograph.—P. C.

ENLARGING? HERE'S A NEW CONTROL

REMOVE LENS COMPONENT ...SEE WHAT YOU'LL GET

Want soft portraits, but not jelly? Faces in which you see bone structure but not wrinkles? Well, forget diffusion discs, scrambled plastic and cellophane. Don't bother moving a dirty glass plate underneath your enlarging lens. Forget racking the lens out of focus—those pictures always look out of focus, anyway. Just unscrew the front element of your enlarging lens! Remove it, work without it.

Reiff experiments. It works!

New York commercial photographer Hal Reiff is an incurable experimenter. By changing the components of his convertible lenses he can vary focal length. Recently in his darkroom he thought, "Why not try this with my enlarging lens?" He reached up, unscrewed the front element of his 80mm Schneider Componon f/4 on his Omega—and discovered a new, creative control.

Reiff's pictures on these pages show the result. You still can see the basic facial structure which gives character and charm. You get maximum diffusion when you use the lens at its widest aperture. By closing the diaphragm you can sharpen the picture to your taste. However, you must refocus the enlarger whenever you change the lens opening. Medium diffusion, *bottom right*, is similar to the effect you would get from using a soft focus portrait lens. It would hide wrinkles (if Reiff's gorgeous model had any!), but would not give the special mood attained at f/4. Try this technique with your enlarger. But beware: The lens element threads are fine. If you're not careful in threading them together, they can jam.

P. S. If your lens element doesn't come out, just forget the whole thing.—FLOYD E. STONE



WHOLE LENS AT F/11—A PRETTY SHARP GIRL



MODIFIED LENS AT F/5.6 REMOVES BLEMISHES

MODIFIED LENS, WIDE OPEN AT F/4, FOR MAXIMUM DIFFUSION



3 COLOR EXTREMES

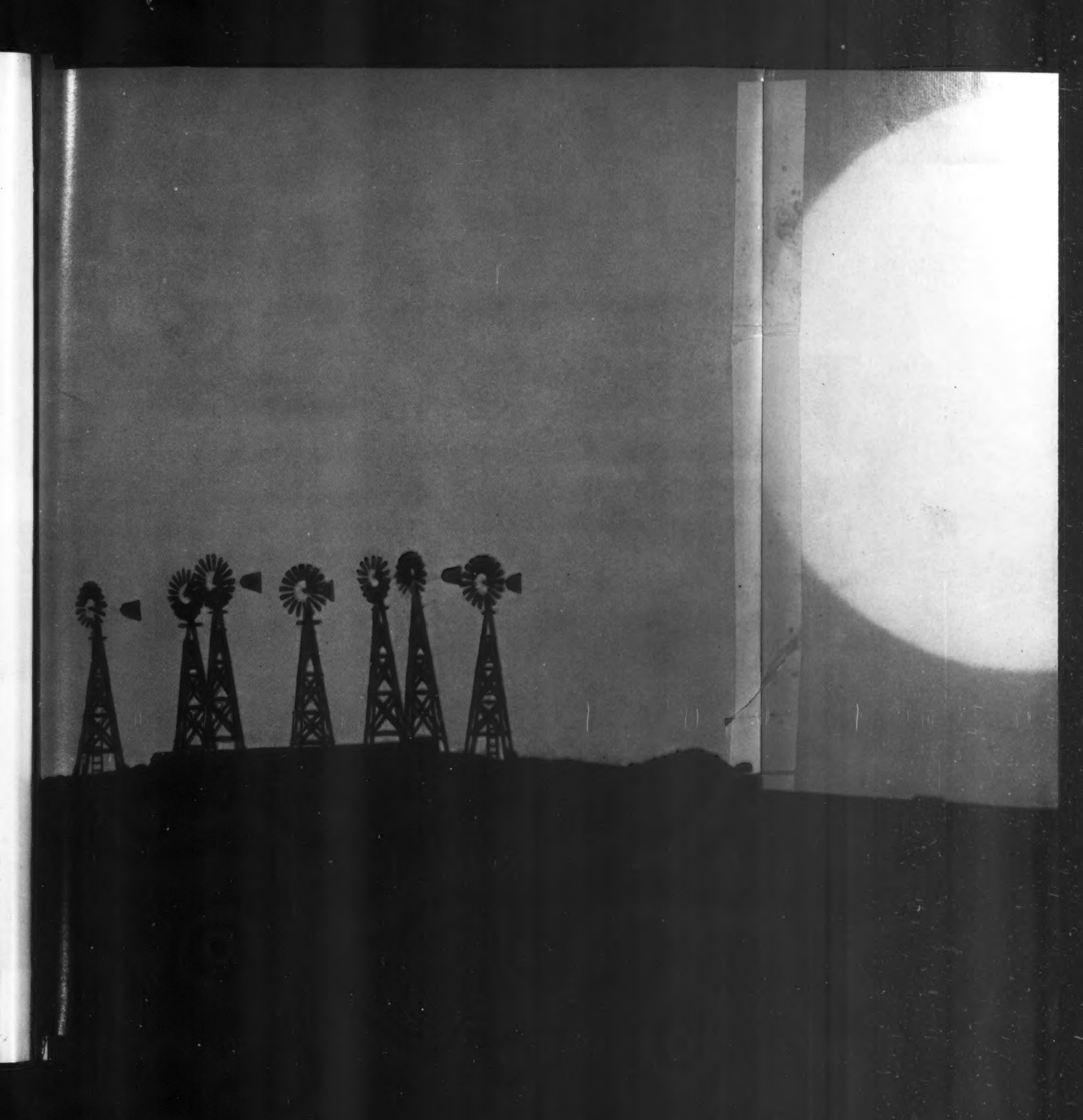
WANT TO SHOOT LANDSCAPES THROUGH A TELESCOPE, CALCULATE EXTREME CLOSE-UP EXPOSURES QUICKLY, TAME BIRDS? HERE'S HOW.

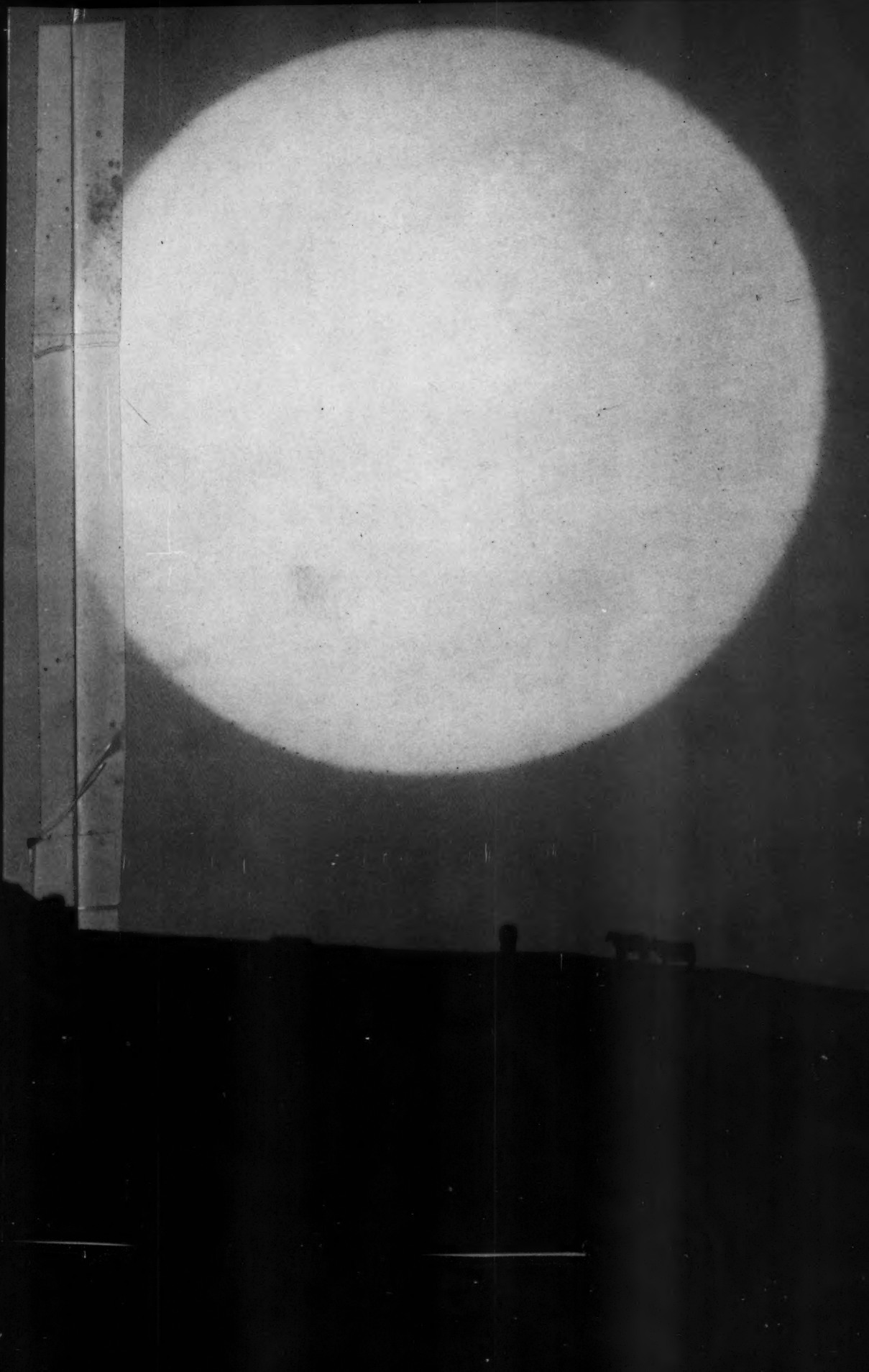
HOW TO DRAMATIZE LANDSCAPES:

(inside foldout) Credit MODERN's columnist Andreas Feininger as well as Swiss photographer Emil Schulthess for employing telescope and the extremely long lens to produce unusual effects in landscapes. Feininger did much work flattening perspective, apparently almost eliminating distance between foreground and background subjects, while Schulthess brought the sun and moon to earth in giant size to dramatize his landscapes. However, photographer George Leavens, who made the brilliant landscape contained in the foldout, knew little more about extremely long lenses or telescopes than the average MODERN reader before he planned this shot. He became very intrigued with the possibilities of terrestrial photography while in North Dakota where flatness of terrain permitted him to view landscapes for miles through a 20X Bausch and Lomb telescope. If only he could catch that brilliant, highly magnified ball of sun above an interesting view. To be sure of his technical ability to shoot through the 'scope if and when he had the right foreground and atmospheric conditions, Leavens mounted his Leica with a Kilfitt reflex housing to the telescope's eyepiece and did some experimenting. By running a careful series of exposure tests he calculated the actual aperture of the telescope and camera combination to be about $f/16$. Tests were made on 35mm Kodachrome, the film Leavens

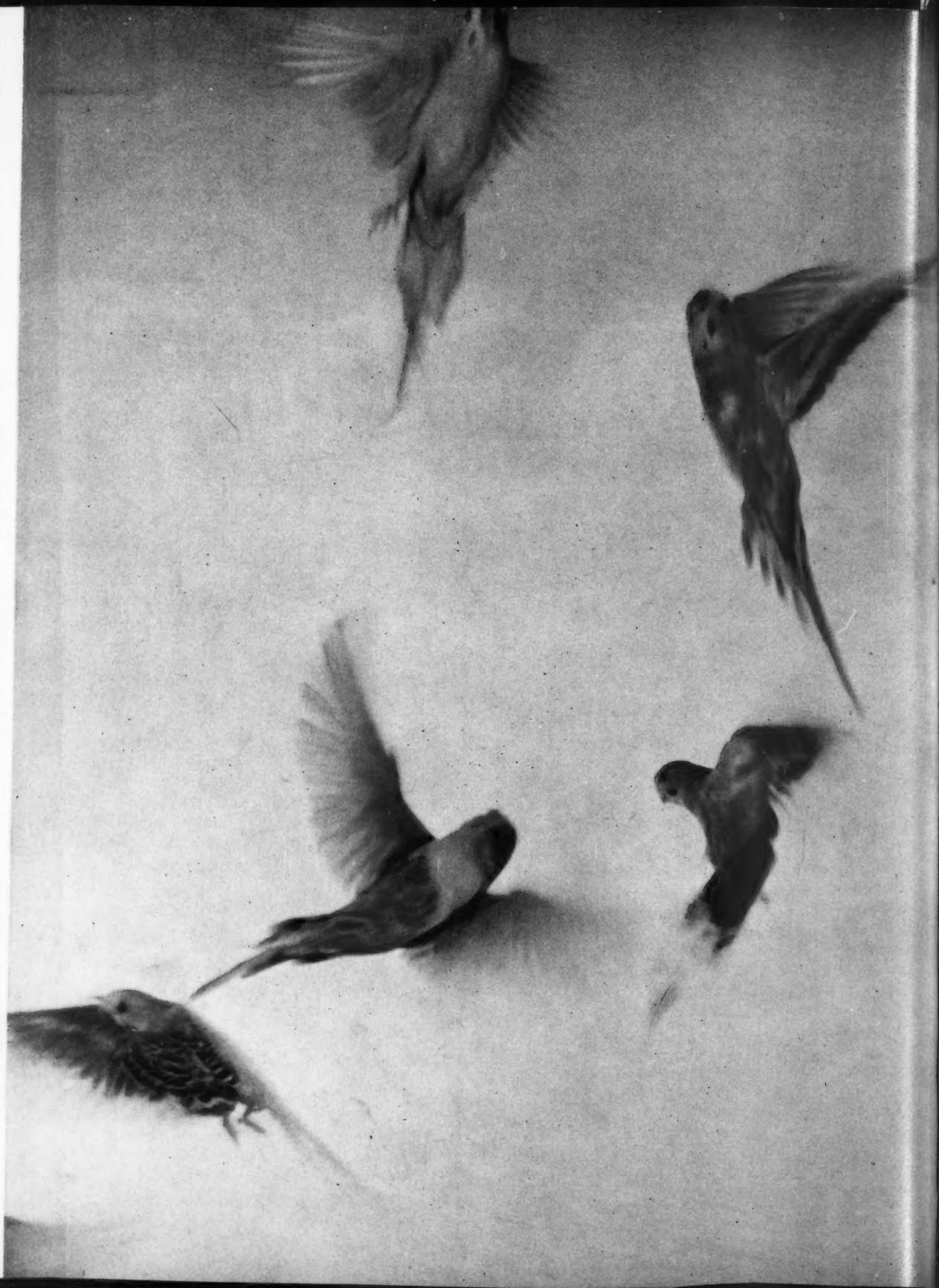
planned to use in the actual shot. The exposure problem was difficult. If Leavens made the picture on a clear day, the sun would have been so brilliant it would have obliterated the dark foreground completely. One evening at 7:30 P.M., conditions were ideal—a haze covered the sun, cutting down its intensity to a point where a compromise exposure was possible. The focus was also a compromise since the telescope's depth of field would not encompass both foreground and sun sharply. However, by focusing mostly at the landscape itself, he threw the sun out of focus, making it appear larger and further dispersing the sun's intensity. His final exposure was two seconds at $f/22$. (For proper astronomical photography of sharp sky objects, planets, moon, etc., such an exposure without a motorized drive to track the bodies as they move across the sky might not be feasible. For Leavens' shot it was not necessary, of course.) His biggest problem, oddly enough, was getting the proper length extension tube and fitting in order to fasten the reflex housing at the right distance from the telescope eyepiece. Finally, he had it made to order. For the record, it was 131mm in length. Many telescope manufacturers, however, do furnish complete data or tubes for mounting cameras to their units. Leavens feels that many shots through telescopes don't pan out because the cameras are fastened onto the telescopes in a slipshod manner.

TEXT CONTINUED ON PAGE 71









HOW TO SHOOT PARAKEETS: Much bird photography necessitates stalking a wild prey with tele lens, electronic flash, remote control and photoelectric eye tripper mechanisms. The results are often fascinating. However, parakeets are tame birds, aren't they? And if you wanted some good shots of same you wouldn't have to stalk them with a long lens. You'd just walk up to them and take their pictures wouldn't you? Think so? Well, Yusaku Kamekura, art director of the Japanese magazine *Ashai Camera*, like photo editors and art directors all over the world, came up with a novel idea for a magazine cover. It's simple, he assured photographer T. Kajima. All you need are five parakeets in an exact flight pattern. That should be no problem, should it? So Kajima went home and brooded, birdlike, for a day. Finally he built a large round transparent birdcage, 6 ft. high and 12 ft. in diameter, in his studio. In it, he caged himself, his Mamiyaflex C twin-lens reflex with 105mm Mamiya Sekor lenses, five speedlights and ten frightened parakeets. The results? Nothing. Not one budgie budged. They clung to the cage with wings furled. Kajima's wife, children and assistants watched on the outside, then banged on the cage. Wings stirred into motion, shutters clicked, electronic flash units went off, hell broke loose at f/22, so to speak. In forty minutes, Kajima

had shot 26 transparencies. Most of the shots showed only one parakeet in action. However, all was not lost. Kajima had used a plain white background. By binding together transparencies he could produce two, three or any number of birds, supposedly in one shot, with little loss of color in background or subject matter. And he could position any bird of any color where he wanted him (or her). Result: the perfect mating of parakeet images, just as the art director ordered. It's interesting to note that Kajima's electronic flash was not fast enough (of short enough duration) to stop all bird motion. Although many quite knowledgeable photographers unconsciously think that electronic flash stops almost all action, the truth of the matter is that the more powerful units generally have relatively long flash durations of 1/500 sec. or even slower and, therefore, will not stop all action. The smaller, less powerful units often have durations of 1/1000 sec. or shorter.

Would Kajima's picture have been better with all wings stopped in needle sharp detail or do the soft blurs imply a feeling of wings flapping, birds flying? The choice was not up to the photographer. He was limited by his equipment.

In any event, Kajima, like a statue near any bird congregation, was a sight to see when he emerged from that cage. It's a good thing cows don't fly.

HOW TO SHOOT CLOSE-UPS: One of the new worlds you discover with a single-lens reflex and bellows or extension tubes is the world of the close-up. Tiny, intricate detail, overlooked before, can be singled out and photographed. There is beauty and there is pattern. Willard Conrow found both within a dandelion flower. Instead of guessing the exposure and hoping that a blurred background would set the delicate flower tracery off properly, he took his time. It paid off handsomely. He found a green camp chair, turned it around so its back faced the camera and thus became the background. He placed a bellows on his Exakta VX and fastened his normal preset 50mm f/2.8 Tessar lens to it, then loaded Kodachrome. With the camera on a tripod he moved in on the dandelion, racking out the bellows until he had just the composition he wanted. Now came the time for exposure determination. When you're extending your lens beyond its normal focusing range, with either tubes or bellows, you must increase your normal exposure to compensate for the great lens-to-film distance. While many charts and tables exist to

help (or confuse) you, Conrow uses a much simpler method of computing exact exposure using the scales of his Norwood Director incident light meter as a slide rule. In this case he first measured the length of his bellows draw. It was 4½ in. Next, he took a reading of the light falling on the flower and set his meter accordingly. Then he went directly to the scales of his meter. He pretended the f-stop (aperture) scales were actually inches. He located the 4½ in. bellows draw position on the f-stop scale at f/4.5. (if his bellows had been 3½ in., he would have used f/3.5, etc.). Opposite the 4.5 mark, he read 1/200 sec. Now he moved this speed opposite the f/2 aperture position (which he used as 2 in., the focal length of his lens). Lastly, he found his exact exposure by locating the aperture he wanted to use (f/22, for maximum depth of field); opposite the f/22 aperture was the right shutter speed, 1 sec. Although it sounds complicated, it takes only seconds in practice. It will work with any meter having a full set of f-stop and shutter speeds. Actually, this system has been used by commercial photographers for years.—THE END

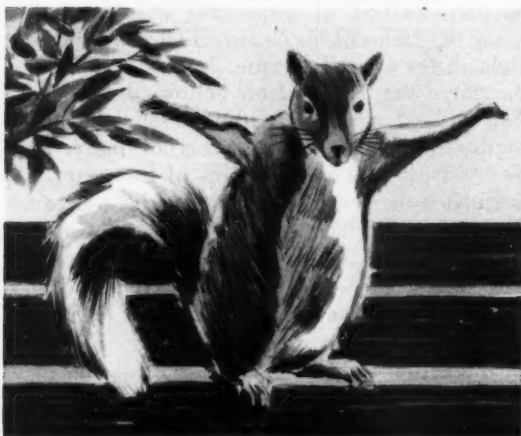
3 PICTURES I MESSED UP ... AND WHY I DID IT

SAMSON RAPHAELSON CONFIDES TO YOU HIS GREATEST SINS

I FIND THE CITY PARK an endlessly wonderful place for picture taking. I can testify photographically to the opportunities, not with wonderful shots, but with shots where there was something wonderful I missed. I missed them because I wasn't good enough. Pooh on the fellow who says he was too late or didn't have the right lens; Alfred Eisenstaedt is not too late and he does seem to have the right lens. And when he is too late and hasn't the right lens it doesn't seem to matter because he has the right lens and is on time for so many thousands of pictures.

I think I've learned a lot by studying these shots and remembering the circumstances under which they were taken. For instance, there was a shot last winter of a

THE OLD SQUIRREL GAME: Raphaelson sees squirrel. Squirrel sees Raphaelson. Both are impressed. Squirrel adopts interesting pose, Raphaelson fumbles for equipment, has wrong lens, gets wrong exposure. Squirrel gets tired. Raphaelson ekes out snapshot at bottom.



squirrel (see pictures, *this page*). My wife and I were walking in the park. I am in the habit of taking my Leica M3 in a small bag with the "regular" 50mm Summicron f/2 lens and a 90mm Elmar f/4, both in collapsible mounts. I also carry a number of filters: red, green, yellow and skylight. In the last years or two I have used only the yellow and the skylight—no compliment to myself.

So I'm in the park, happening to have the 90mm lens on the camera. The camera is zippered in the bag, not out where I can use it. My wife and I are talking about—our troubles—what else do you talk about? I don't always go to the park concentrating on photography. But I always take the camera along, whether I feel like photographing or not.

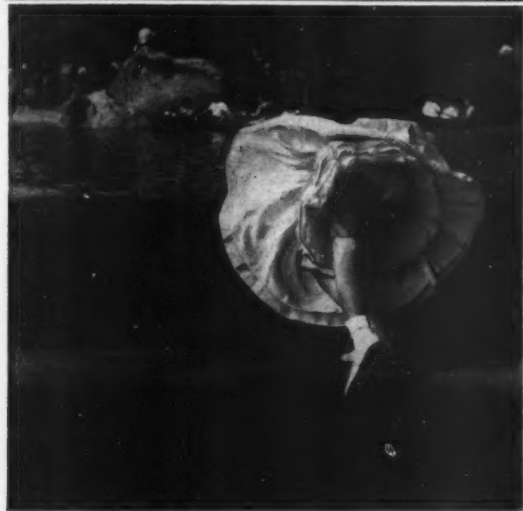
Back to the squirrel. I see the beautiful snow behind him, the lovely wood of the overturned park benches in the foreground. I wish I had the 50mm lens. The advantages are depth of field, less chance of camera shake. The squirrel will let me get close, much closer than I actually got with the 90mm. But it was too late; I couldn't change lenses. So whose mistake was it? Let's say it was the squirrel's.

How I think I expose

Now to my own mistakes. My first was that I underexposed. I had taken a general reading when I entered the park. I didn't change it here, and I should have known better. To get the texture of that wood properly, I should have opened up at least one stop.

It's an inexcusable oversight. A man should shift his exposure instinctively with the shift of light on a given subject, after having taken his general exposure. That is usually what I do. I take a reading on the grass, on the cement. Actually the cement is usually one stop lighter than the grass—it reflects more light. Then I take a reading on my hand. All in the sunlight. Skin is usually two stops brighter than the grass. If I'm going to include a human face, I don't want it to come in chalky white. Then I take a general shadow reading. I set my "basic" exposure halfway between the shadow and skin readings, but I change it for almost each shot.

Then, with each shot, I decide my setting in terms of how much depth of field I want. If, for instance, my



THE COMPOUNDED PROBLEM: Was there a question of privacy or taste? No, particularly since nobody would recognize that girl. But Raphaelson had the camera in the gadget bag and was too embarrassed to get close. Result: bottom shot instead of top.

"basic" reading is for $f/16$ at $1/100$ sec., $f/16$ being the smallest opening on the 50mm lens, I may decide to stay with that for the fullest depth of field. On the other hand, if I want to stop fast action, I'll go down as far as $f/8$ at $1/500$ sec. Another reason I use high speeds is that I have never perfected those iron-hand techniques that you read about in the books—how you press the camera against your nose, take a deep breath, and so on.

Again, back to the squirrel. He was looking directly at me, arms outstretched, singing "Mammy"—a Jolson squirrel. He was not only singing "Mammy," but he was posing for it, standing there relaxed, a ham squirrel waiting for the camera. I got out the Leica, focused the 90mm lens at $f/11$, where it happened to be, leaving the shutter speed at $1/250$ instead of opening to $1/100$. He was still singing Mammy. This was from heaven; how often does a squirrel wait for a Leica M3? Just as I'm ready to shoot, a man comes along in the snow background, upper right, sees me and the

squirrel, pauses and stares with approval and friendliness, not realizing he's ruining the picture, or at least that I think he's ruining the picture.

I was so fixed on the image in my mind of the squirrel with unpopulated background that I couldn't readjust and shot anyway. And there's why, when they talk about what separates the men from the boys, I'm still with the boys. What did I have to lose by shooting? And re-cocking and taking my next chance? Instead, I looked at the man with silent fury, not daring to speak for fear of losing the squirrel, and finally he got the idea and moved. I shot quickly. But the Mammy song was over and the squirrel had moved back just enough to be slightly out of focus. Having the squirrel sharp, in this particular picture, was of the essence. Remember, I was using a 90mm lens where the depth of field is narrower than in a 50mm lens, so a slight move took him out. That picture, to me, is an "almost." Perhaps when reproduced, it would look good, because one allows for a loss in reproduction. But the final payoff on a picture is the actual print. Mine shows a conventional non-Jolson squirrel, frustratingly unsharp with no rich dividend of wood texture in the foreground.

Now in this next picture, that of a darling little girl (see pictures, *opposite*), I wish I had had the 90mm lens instead of the 50mm. (The ideal thing would be two cameras.) I was too far from (*Continued on page 98*)

THE BOY THAT WASN'T: Pattern of boats with boy racing across is what Raphaelson saw (*above*). Entangled behind wire and iron posts, seconds too late on the draw, Raphaelson caught static boats (*below*) rather than active shot of boy and boats.



DISCOVERY no. 45





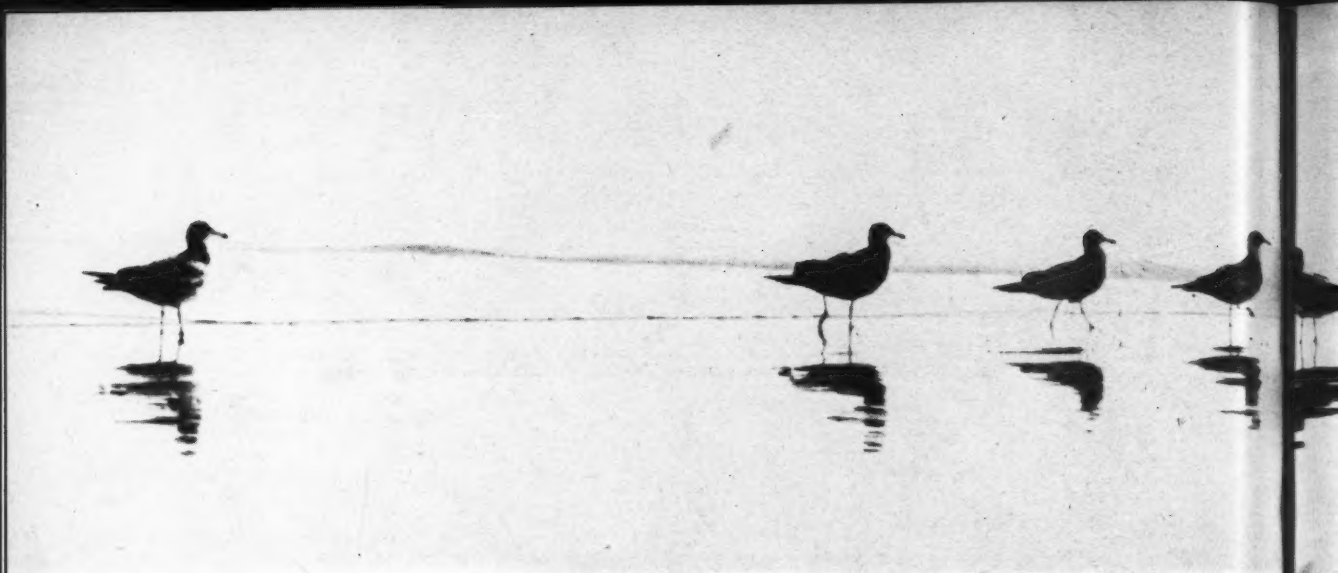
**CHADWICK HALL'S PHOTO-
GRAPHS ARE DISTINGUISHED
BY A PARTICULARLY PRE-
CISE FEELING FOR COMPOSI-
TION, A HIGHLY DEVELOPED
SENSE OF FORM. SEE TEXT
PAGE 102 FOR DETAILS.**

White house, *left above*, was photographed from a distance with 250mm Sonnar on a Hasselblad in order to avoid converging vertical lines. Here, Chadwick made use of the square format, did little cropping in enlarging. Tri-X, E. I. 400, UFG, f/5.6, 1/50.

Victorian house, *left*, like that *above* was photographed with longer than normal lens. Extreme cropping emphasizes verticals. This elongation is also found in portrait of girl, *opposite page*. Hasselblad, 250mm Sonnar, Tri-X, E. I. 400, UFG, f/5.6, 1/50.

Girl, *opposite page*, was photographed at beach on bright overcast day. Chadwick shot from a low angle and close to the subject, emphasizing vertical lines. Hasselblad, 80mm Ektar, Tri-X rated at E. I. 400 and developed in UFG. F/5.6, 1/50 sec.





MONTHLY CONTEST



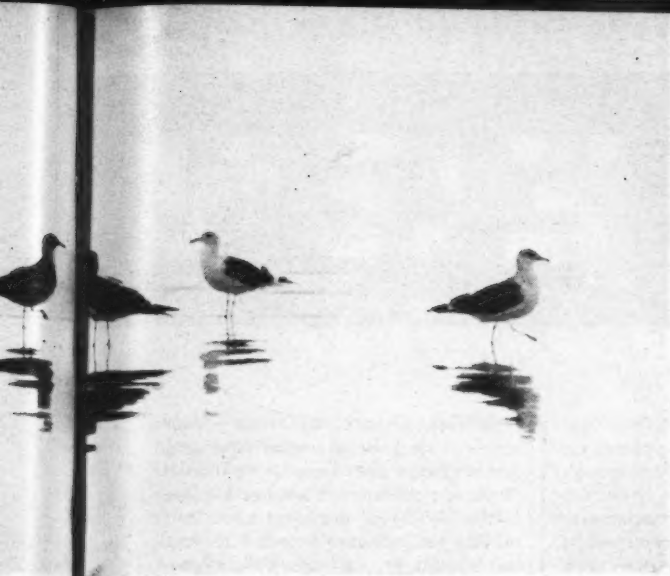
SLIGHTLY UNDEREXPOSING slow film produced more contrast between darker, brighter tones. Reinhard Siegel, Hagen, Germany, used 200mm Tele-Quinar lens, Exakta Varex, Isopan FF, 1/150, f/4.5.

Exposure can make the picture

SOMETIMES we talk of exposure as a problem and other times we say "Exposure? That's not the problem. That's the answer." Sometimes we say forget the whole thing, getting the image is what counts, always. And of course, it is. But it isn't often we have to choose between getting *any* image at all and getting the one we want. There are endless occasions when there is time to decide what exposure will give us the best picture quality.

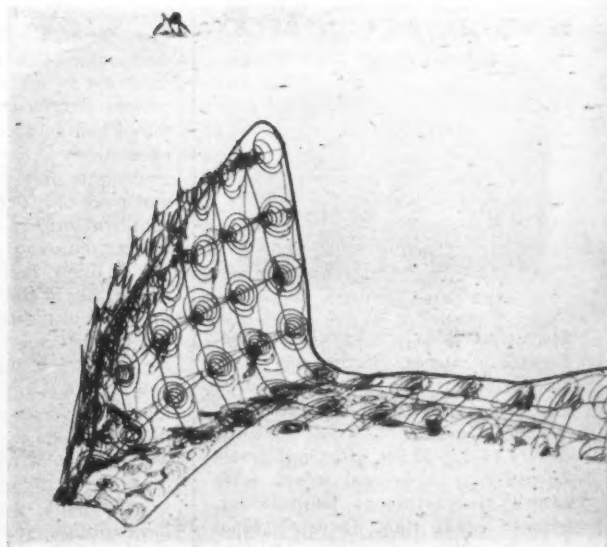
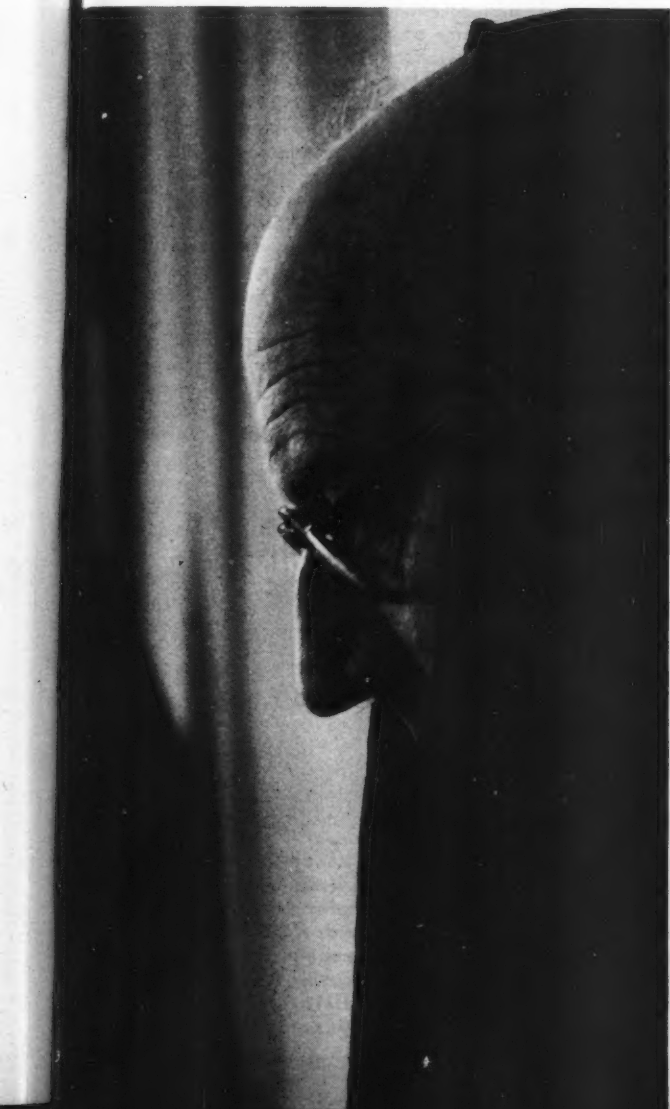
Good exposure techniques are implicit in the photographs by this month's contest winners. Good techniques do not necessarily mean exposing correctly. You may have to make some changes. In the picture of the gulls at the beach, *above*, the photographer altered the "correct" exposure to meet his own conception of gulls and exposed accordingly, retaining what was to him essential. Know what *you* want in a picture. Knowing your exposure techniques will help you get it.

Anyone may enter any number of black-and-white prints in MODERN's "Monthly Contest." Pictures must be 4 x 5 or larger. Polaroid prints may be submitted in original size. Your name, address and all technical data must appear on the back of each print. No entry blanks are required. *Please enclose a stamped (first-class postage), self-addressed envelope* if you want us to return pictures we're unable to use. Send them to Columns Editor, MODERN PHOTOGRAPHY, 33 W. 60 St., New York 23, N. Y.



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◁ **SLIGHTLY OVEREXPOSING** Tri-X, Richard V. Mueller, Santa Barbara, Calif., gained detail in shadow side of gulls, washed-out highlights. Rolleicord V, 1/125 sec., f/8.



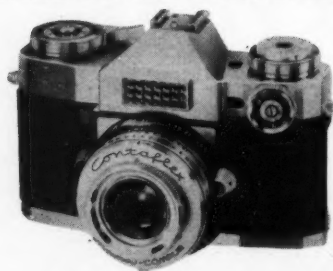
△ **PRECISELY EXPOSING** negative brought out the shadow detail of bedspring in foreground. Robert Bengtson, Astoria, N. Y., used Rolleiflex, Verichrome Pan, 1/125 sec., f/22.

◁ **CAREFULLY EXPOSING** by meter for facial tones, Art Fillmore, St. Louis, Mo., used 105mm lens for this dramatic portrait. Leica M-3, Tri-X, 1/25, f/2.5.

MODERN

MODERN PHOTOGRAPHY'S exclusive monthly equipment report section devoted to informative, unbiased field tests of equipment submitted to the editors for review.

COUPLED METER, RAPID WIND ON THE CONTAFLEX



Manufacturer's Specifications: Contaflex Super, 35mm eye-level single-lens reflex camera. **Lens:** 50mm Zeiss Tessar f/2.8. **Shutter:** Synchro-Compur MXV with speeds from 1 to 1/500 sec. plus self timer. **Focusing:** Eye-level prism with central split-image rangefinder, ground glass ring, focusing from 2 1/2 ft. **Other features:** Rapid wind, rewind levers, built-in meter coupled to diaphragm controls, automatic lens diaphragm, provision for interchangeable front lens components. **Price:** \$199.50. **Importer:** Carl Zeiss Inc., 485 Fifth Ave., New York 17, N. Y.

The very name "Contaflex" has almost become generic for a specific breed of German-made 35mm prism reflex with leaf shutter, completely automatic diaphragm and spring operated mirror which returns to viewing position when the film is wound to the next exposure. It's pleasant to report that the newest camera bearing the name retains the finest features of its predecessors and adds a few much needed new ones.

The view through the prism continues to be one of the brightest on any single lens reflex even though focusing proper can only be done with the excellent split-image rangefinder or ground glass collar which surrounds it—the rest of the image area is a brilliant non-focusing finder with Fresnel lens. But what's this to the right outside of the picture as you look through the finder? It's the needle for the new exposure meter which instead of being just built-in as in previous Contaflexes, is actually coupled to the diaphragm. You can see the whole area and this needle even if you wear glasses. Scoffers who seem to believe that a built-in coupled meter is an unnecessary evil are hereby advised to investigate this one. We found the meter not only accurate but extremely sensitive and quick to operate. First you set the exposure index of the film you're using, 8 to 1300, on the dial within the knurled knob located on the front of the camera. Then you set the shutter speed. Now look through the viewfinder. By turning that front knurled wheel you can adjust the aperture while watching the needle within the finder. When the needle lines up with a central notch, the camera is properly set. Then, should you want to shift shutter speeds without changing exposure, you can turn the shutter speed ring on the camera mount and the aperture ring will also turn automatically, keeping the exposure constant. Sensitivity tests carried out on the meter indicated that the cell could determine an exposure as low as f/2.8 at 1/15 sec. in dim light with the film index at 400. This is an excellent performance. Accuracy was also very good but care must be taken to protect the unshielded cell from extraneous overhead or side light which may cause inflated readings. Of course this holds true for all meters whose cells are not recessed into a hood.

The rapid wind lever turns in a 180-degree arc and must be operated in one stroke. The folding rewind crank is of a good size and can be grasped securely even with large fingers.

Overall handling of the camera

is efficient indeed. By placing your index fingers on the two opposing focusing lugs, keeping your right forefinger on the smooth shutter release in the middle of the wind knob and turning the aperture wheel with your left forefinger, you can follow your subject, focus, change exposure and shoot without moving a single finger from a control position!

No tests were carried out on the reputable f/2.8 Tessar but past experience with this lens setup, which is the same as on the Contaflex III and IV now discontinued, indicates that the Tessar is quite good at full aperture with some fall-off in the corners. The fall-off disappears at f/4. Best overall definition point is reached at about f/5.6. The accessory 35mm and 90mm f/4 lens components which bayonet in place of the front cell on the Contaflex give good performances if not up to what you might expect from complete tele and wide angle lenses.

Another new Contaflex, the "Rapid" model without meter, is also available at a slightly lower price. But in our opinion, the meter is well worth the difference.—H.K.

EDIXAFLEX: A REFLEX WITH ROOM TO GROW



Manufacturer's Specifications: Edixaflex, 35mm waist-level single-lens reflex camera. **Lens:** 50mm f/2.8 Ico Westanar f/2.8. **Shutter:** Focal plane with speeds from 1/25 to 1/1000 sec. **Focusing:** Waist-level viewfinder which is interchangeable with accessory eye-level

TESTS

the newest cameras
the latest films
important accessories

prism, split-image rangefinder glass available, focusing to 2.7 ft. **Other features:** Rapid wind lever, semi-automatic internally coupled diaphragm. **Price:** \$199.95. **Importer:** Edixa Camera Co., 10 S. 2nd Ave., Mt. Vernon, N. Y.

Unlike the man who buys a stripped-down, low-powered car for basic transportation, the photographer who purchases the least expensive of the Edixa reflex camera line, the Edixaflex, can add the equivalent of more horses and the chrome as and if he wants. The Edixaflex with waist level finder and 50mm f/2.8 Isco lens in semi-automatic mount is certainly good basic transportation, photographically speaking. The slightly bulky but very solid camera body itself, aside from the lack of slow speeds (and how often do you really use them?) is exactly the same as in the more expensive Edixa Reflex B with full internally coupled semi-automatic diaphragm. The extremely compact waist-level finder with built-in magnifier shields the ground glass quite well, producing a reasonably bright focusing and viewing image until the day comes when you plunk down \$39.50 for an eye level prism. Vertical pictures are difficult however since the camera has no frame finder.

Mechanically, we've had no trouble with Edixas in the past and had none with the Edixaflex. The shutter and non-rapid return mirror are rather quiet. Frame counter and shutter speed markings are sometimes difficult to read when light reflects from the camera top.

Camera controls seem to fall quite logically under appropriate fingers: If you hold the camera with your right hand and reach around beneath the lens to turn the focusing mount, with your left thumb and forefinger, the single-stroke rapid wind lever is right at the ball of your right thumb and the lens recocking lever can be operated swiftly after exposure with your left forefinger.

The Westanar lens itself has front element focusing, only the front ele-

ment turns and moves outwards from the camera body. Although this can prove a difficulty with polarizing filters which ought to stay put and not rotate, the system does have one advantage. Unlike lenses which move in and out completely when focusing, the front cell focusing lens maintains exactly the same size image on the film. The size of the image produced by the moving lens changes depending on the point of focus. Tests of the Westanar lens, which alas, focuses to 2.7 ft. indicates that at f/2.8 image quality is only fair. However, by closing diaphragm to f/5.6 and smaller, sharpness becomes excellent.—H. K.

RETINA REFLEX S: IT'S HERE AND YET IT ISN'T



Manufacturer's Specifications: Retina Reflex S eye-level single-lens 35mm reflex camera. **Lens:** 50mm Rodenstock Retina Ysarex f/2.8. **Shutter:** Synchro-Compur MXV with speeds from 1 to 1/500 sec. plus self timer. **Focusing:** Eye-level prism with full ground glass plus central split-image rangefinder, focusing to 3 ft. **Other features:** Rapid wind lever, built-in meter coupled to diaphragm control, automatic lens diaphragm, provision for interchangeable lenses with behind-lens shutter. **Price:** To be announced. **Manufacturer:** Kodak AG, Stuttgart, Germany.

While the new Retina Reflex S with Schneider f/1.9 or f/2.8 lenses is not

yet available through its official importer, Eastman Kodak Co. of Rochester, interest has been so keen in the many Reflex S's that have found their way into dealers' shelves, we thought we'd steal a march on the official importation and review one of the store models. Consequently we borrowed a Retina Reflex S from the Wall St. Camera Exchange in New York to see just how it compared with the older and still available Retina Reflex as well as the "S" models which Kodak will distribute in a matter of months.

Basically the Retina Reflex S is the same quiet operating, compact camera as the older model, with an evenly illuminated complete ground glass and automatic diaphragm with spring-operated non-rapid return mirror.

The two outstanding new features on the "S" model are full interchangeability of lenses, and meter not simply built-in but actually coupled to the diaphragm control. The unit we borrowed, although marked in English and with distance scale in feet, not meters, has a Rodenstock lens rather than a Schneider. Although it is not guaranteed by Eastman Kodak Co. in Rochester and does not bear the EK plus serial number marking on the camera top, it is no less a good camera.

The exposure meter coupling operates as follows: set the film index, from 10 to 3200, on a dial atop the camera, move the shutter speed ring on the lens mount to the speed you wish to use. Now rotate a knurled wheel on the bottom of the lens mount while watching the meter needle located in a window atop the camera. When the meter needle is aligned with a yellow pointer, the camera is properly set. Although the system is perhaps not so handy as having the needle appear directly in the viewfinder, it does have a great advantage. When you turn the knurled aperture wheel and reach the last opening without getting the needle and arrow matched, whether at f/2.8 or at f/22, more turning of the wheel will start the shutter speed ring changing until the proper exposure is reached.

(Continued on page 80)

MODERN TESTS

(Continued from page 79)

posure is reached. The meter itself, which in size and sensitivity appears to be the same as in the other Retina Reflex model when tested, was able to read an exposure of $\frac{1}{8}$ sec. at $f/2.8$ with the index set at 400, a really excellent performance. Accuracy was very good as well. However, as with other built-in meters, care must be taken to shield the cell from extraneous top and sidelight or inflated readings may result.

Although we found the automatic depth of field indicators helpful and the focusing mount quite smooth we were sorry to note that the Rodenstock Ysarex focused no closer than 3 feet, a good standard for a rangefinder camera but rather distant for a single lens reflex. In addition, we'd suggest you compare the brightness of the viewing field of the $f/2.8$ lens and the field at the $f/1.9$ on the new "S" model. Obviously there is a small loss of brightness on the ground glass screen with the slower lens. Whether it's important or not is up to you.

As it's been a long time since we've tested Ysarex lenses. We were particularly interested in seeing how they compared with optics of similar aperture, focal length and construction. Tests showed that this $f/2.8$ Ysarex performs similarly to a good $f/2.8$ Xenar. It's very good wide open at $f/2.8$, showing only a slight amount of edge sharpness fall-off and flare. Sharpness proved to be excellent at about $f/5.6$ and $f/8$ (virtually no unsharpness at the edges or any flare could be seen). Sharpness stayed excellent when we stopped down even to $f/16$.

Other Retina Reflex S features: frame counter indicating remaining exposures locks shutter release when last exposure is reached, single-stroke rapid wind lever is on camera bottom, rewind button remains in during rewinding, camera back opening button has spring-operated protective cover.

Incidentally, although no official prices now exist for the Reflex S, it will list for \$235 with Schneider Xenar $f/1.9$ lens when officially available. But should you buy a Retina Reflex S with Rodenstock lenses now you will be able to fit the 28 to 135mm accessory lenses of other manufacturers to it, and all these lenses also fit the Kodak Retina IIIS rangefinder camera as well, a neat setup for anyone who'd like the best of two worlds.—H. K.

FIT FIVE LENSES INTO ONE AUTOMATIC MOUNT

Manufacturer's Specifications: Sandmar Automatic "Magic Mount" Interchangeable lens system for single-lens reflex cameras. **Semi-Automatic Diaphragm Mounts:** for Exakta cameras, and for Pentax, Praktica, Pentacon F, and similar cameras. **Five lenses:** 6-element 28mm $f/3.5$ Ultra Sandmar, focusing down to $4\frac{1}{2}$ in. 6-element 35mm $f/2.8$ Sandmar, focusing down to 7 in. 9-element 35mm $f/1.9$ Super Sandmar, focusing down to 7 in. 6-element 50mm $f/1.9$ Sandmar focusing to 14 in. 5-element 135mm $f/3.5$ Tele-Sandmar, focusing to 7 ft. **Prices:** mount, \$49.50; lenses—28mm, \$79.50; 35mm $f/2.8$, \$69.50; 35mm $f/1.9$, \$119; 50mm, \$69.50; 135mm, \$69.50. **Importer:** Geiss-America, 6424 N. Western Ave., Chicago 45, Ill.

As an owner of a new 35mm single-lens reflex you probably admire the new automatic lenses. You also hurt a little, in your bankbook. Each time you buy one of these lenses, you pay for the automatic diaphragm mechanism. Why doesn't someone come along with one automatic mount into which you'd just snap various lenses?

Well, the idea has been simmering and now it's served. Enna Werk of Munich has come up with a "magic mount" and five lenses to fit it.

Each lens has a diaphragm and depth of field table. The mount, with diaphragm markings from $f/1.9$ to $f/22$, contains a single mechanism which actuates the diaphragm. It also contains focusing ring, and footage scales for each lens.

The mount also enables you to focus the lenses very closely; in the instance of the 28mm, down to $4\frac{1}{2}$ in.

The mount comes in two models. One fits the Exakta and Exa cameras; the other the Pentacon, Praktica and similar screw-threaded cameras.

To test the mount and its lenses we chose a Pentax. Screwing the mount onto the camera we found the rear pin which operates the diaphragm mechanism wouldn't work. We filed off about $1/16$ in., and were in business. It's possible you may have the same occur to you, but the remedy is simple, and it's better to have that pin too long than too short.

Finally we tried it. It works. It's a joy to be able to lock a lens in securely

and instantly. To owners of Pentax, Praktica, Pentacon F and similar cameras with screw-threads, changing lenses has been relatively slow, and this should interest them.

The mount's semi-automatic diaphragm mechanism is worked by a spring loaded lever which moves diaphragm collar. To open the lens, set the collar to $f/1.9$, then to your desired stop. When you release the shutter, the lens will close to that diaphragm opening. For your next shot you must reopen the lens again with the lever.

The lenses? We tested all but the 35mm $f/2.8$, and all were good to excellent. The 28mm $f/3.5$ at its widest aperture was sharp and thereafter became sharper. The 35mm $f/1.9$ as one would expect, vignetted slightly and lacked corner sharpness at full opening, but at $f/2.8$ became acceptably sharp all over, and at $f/4$ remarkably sharp. The 50mm at $f/1.9$ lacked edge to edge definition but at $f/4$ this cleared up. The 135mm $f/3.5$ had some edge fuzziness at full opening, but not at $f/5.6$, and it gave absolute excellence at $f/8$.—F. E. S.

KONICA 8—AN ELECTRIC EYE ZOOM CAMERA



Manufacturer's Specifications: Konica Zoom 8 movie camera: **Film load:** Double-8 spool. **Lens:** V-Hexanon 13 to 32mm $f/2$ zoom lens with focusing from $3\frac{1}{2}$ ft. to infinity. **Viewing:** Through-the-lens focusing and viewing. **FPS:** 16, 24 and 48 (with accessory power booster). **Motor drive:** Electric motor powered by four Penlite batteries. **Other features:** Semi-automatic electric eye operation for films with exposure indexes from 10 to 160, built-in battery tester, mechanical footage counter and single-frame cable release which operates electric motor. **Price:** \$199.95. **Importer:** Konica Camera Co., 76 W. Chelton Ave., Philadelphia, Pa.

The Konica Zoom 8 is an exciting idea in compact 8mm movie cameras. By building the camera around the

zoom lens and placing the film gate at the rear of the camera rather than at the front, the zoom lens juts out a mere $\frac{3}{4}$ in. from the camera body. The Konica Zoom 8 also features continuous through-the-lens focusing and viewing while shooting, semi-automatic electric eye operation, electric motor drive and other items that make it more than just another movie camera. This camera is a scaled-down version of what a great many professionals would like to see on cameras with a larger film size.

The zoom mechanism is definitely one of the finest we've used. The lens moves from wide-angle long shot to tele close-up in a zoom that seems always smooth—no matter how fast or slow you work the 135-degree control lever on the lens mount. The lens itself proved slightly unsharp at the edges of the frame when used at maximum aperture (f/2). However, sharpness proved adequate at f/2.8 and really good at f/5.6. Tele and wide-angle lens converters will be available, but were not available during our tests.

The electric motor behaved well. We shot footage at 16, 24, and 48 fps (with the accessory power booster containing four extra batteries) and our screenings indicated that the motor operates the shutter at a constant rate no matter what the fps.

The exact point of sharpness was easily discernible on ground glass focusing screen at all apertures to f/11. At openings smaller than f/11 the viewing image tends to be a mite dark. We did most of our focusing with the lens at f/2 and then closed the aperture to the correct lens opening during actual shooting. For maximum brightness in viewing you can exchange the ground glass for a clear, brilliant glass by flipping a lever. Of course the clear glass only shows the area covered and not correct focus on the film.

The fps speed and exposure index controls located in a central panel on the side of the camera are coupled. You must adjust them both before operating the electric eye. Exposure is set by turning the diaphragm control (also on the panel) until a needle in a separate window in the back of camera matches an arrow.

The Konica loading system is radically different from that in most cameras. Since the main part of the zoom lens and electric eye coupling is recessed into the body, the film runs from the feed spool to a gate at the rear of the camera (behind the lens, of course) and then to a take-up spool. The Konica film gate is a bit longer than normally found on 8mm cameras

—and contributes to good registration by providing a flatter film path before, during and after exposure.

Other things we liked: The accurate mechanical footage counter, the provision for a cable release at the back of the camera allowing single frame exposures to be made.—M. A. M.

PORTABLE ASCORLIGHT —HAS TRIGGER TUBE



Manufacturer's Specifications: Ascorlight A205 portable electronic flash. **Operation:** 510-volt dry cell battery. **Recycling time:** $1\frac{1}{2}$ sec. **Effective flash duration:** $1/2000$ sec. **Other features:** 30 watt-second capacity, 1000 ECPS (Effective Candle Power Seconds), trigger tube circuit, pulsating ready light, button for open flash, outlet for slave attachment or extension flash, interchangeable reflector for wide-angle photography, bracket which lets you bounce light in any direction (also has flash off the camera release). **Weight without battery,** 3 lb. 7 oz. **Price:** \$59. **Manufacturer:** American Speedlight Corporation, 63-01 Metropolitan Ave., Middle Village 79, N. Y.

Many electronic flash units look alike and even flash alike. The Ascorlight A205 looks like many other units having a flash head containing the flash tube, reflector, and components, a separate power pack and a heavy-duty coil cord connecting the two.

The Ascorlight differs on the inside. For example: it has a trigger tube circuit which absorbs most of the current sent to the shutter contacts when synchronization takes place. It allows only a very small amount of current to reach the shutter, preventing any pitting of the contacts. This feature is usually found only in more expensive professional units. The trigger tube also increases the unit's sensitivity for efficient slave operation.

The A205 obtains power from a

510-volt nonchargeable dry cell battery (\$15.95). Weight is about one pound. Under normal conditions (not left on a shelf for a few years) the battery should last through about 2000 flashes.

We found that the ready light goes on almost immediately (about 1 sec.) after the unit has been discharged. However, this doesn't mean that the unit's ready to be fired. The ready light pulsates slowly at first, then rapidly in about two seconds. When it's in this condition the unit is fully charged and ready to flash.

Ascor claims a guide number of 45 for EI 32 Anscochrome—we tested it and it's exactly 45. For Kodachrome (EI 10) we found a guide number of between 20 and 25 to give what we consider a perfect transparency.

Additional accessories may be purchased for the A205 to convert it into an AC, rechargeable nickel-cadmium, or "D" cell unit.

The Ascorlight A205 is comparatively light-weight, easy to handle, dependable.—E. M.

WALZ AUTOFLASH HAS BOOSTER UNIT



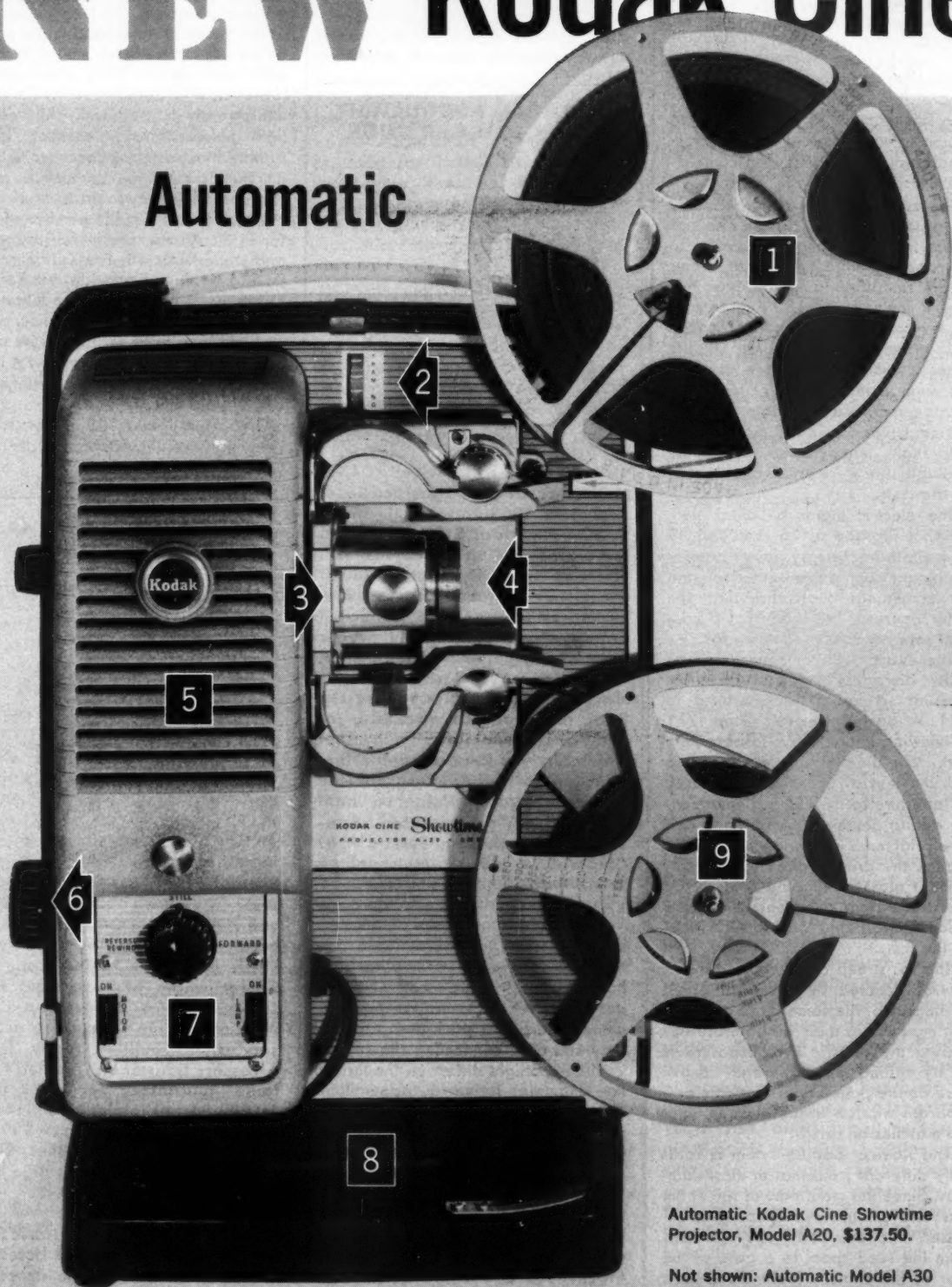
Manufacturer's Specifications: Walz Autoflash electronic flash unit. **Operation:** 240-volt dry cell battery. **Recycling time:** 6 to 7 sec. **Flash duration:** $1/1000$ sec. **Reflector angle of coverage:** 60° . **Other features:** Bounce and direct flash connection for camera accessory shoe, built-in ready light, accessory booster unit, sealed flash lamp guaranteed for more than 10,000 flashes, outlet for extension flash. **Price:** (with battery): \$29.95, (booster, \$14.95). **Importer:** U. S. Photo Supply Co., 6478 Sligo Mill Road, Washington 12, D. C.

The Walz Autoflash electronic flash unit can be mounted on the accessory shoe of your camera or attached by means of a regular flash bracket. The accessory shoe foot on the barrel of

(Continued on page 100)

NEW Kodak Cine

Automatic



Automatic Kodak Cine Showtime
Projector, Model A20, \$137.50.

Not shown: Automatic Model A30
with dry splicer, variable-speed
control, AC-DC operation, \$167.50.

Showtime Projector

1. 400-foot reel capacity lets you program half-hour shows. Reel arms fold for compact storage, fast setup.

2. Convenient framing dial.

3. Durable pulldown claw assures absolutely rock-steady pictures, provides a flicker-free, smooth performance.

4. Fast $\frac{3}{4}$ -inch Lumenized $f/1.6$ lens with conveniently located focusing knob gives you razor-sharp screen image.

5. New 500-watt projection lamp has a built-in, non-axial, condenser-type reflector that directs maximum light through aperture for exceptional screen brilliance.



6. Elevation knob centers image on screen vertically.

7. Operating controls for forward and reverse projection, power rewind, and "stills" are conveniently grouped on illuminated panel.

8. Storage compartment holds 400-foot reel and power cord.

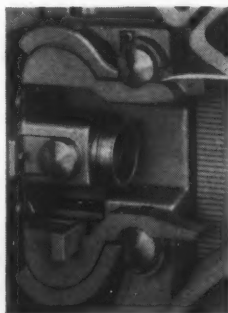
9. Reel with special core automatically takes up film.

Quiet motor with powerful cooling system; permanent factory lubrication; built-in case construction with snap-on cover.

Look how this fully automatic 8mm projector threads itself right onto the take-up reel



Sprocket feed automatically takes film from fingers . . .



passes it through gate and loop guides and then . . .



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Only the new Kodak Cine Showtime Projector handles the job of starting your show so automatically—so completely.

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And it's an image with exciting brilliance. A new high-lumen projection lamp, teamed with a specially designed shutter and pull-down, floods the screen with light.

Professional performance

Here is the 8mm projector that gives your movies the smooth, professional performance they deserve—from start to finish.

If you take your movies seriously, ask your photo dealer to screen one of your favorite reels with the new automatic Showtime. See the wonderful difference it makes in the way *your* movies look.

KODAK CINE—the finest name in movies

Prices are list, include Federal Tax, and are subject to change without notice.

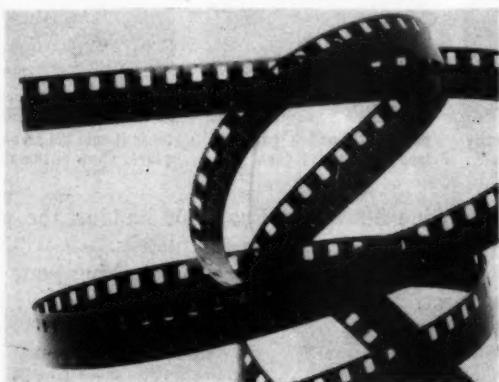
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Kodak

WANT PHOTOGRAPHS FROM MOVIE FRAMES?

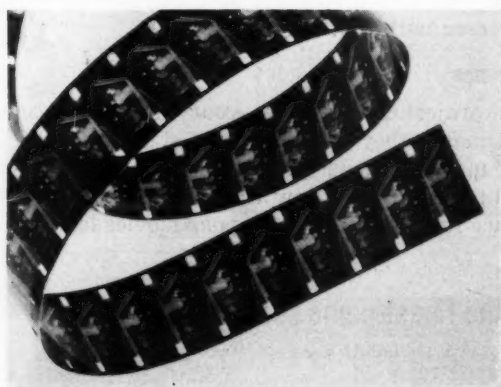
HERE ARE TWO EASY WAYS TO CONVERT MOTION PICTURE SCENES INTO BLACK-AND-WHITE OR COLOR PICTURES WITHOUT A DARKROOM.



IF YOU START WITH 8MM FILM: You can make stills from either color or black-and-white movie frames. Close-ups of people or scenes with large masses generally produce the most satisfying results.



AND USE A CINELARGER: It's actually a copying camera using 120 or 620 film. The roll of film loads as in a camera. Frame fits in gate.



IF YOU START WITH 16MM: Because the 16mm movie frame is 4X larger than the 8mm, final result is bound to be better because less enlargement is required for same size print. Use magnifier to choose sharp frame.



AND USE THE DUPLIKIN: There are various models fitting Leica, Pentacon, Praktina, and Exakta mount bodies. Frame fits gate. Unit needs no focusing.

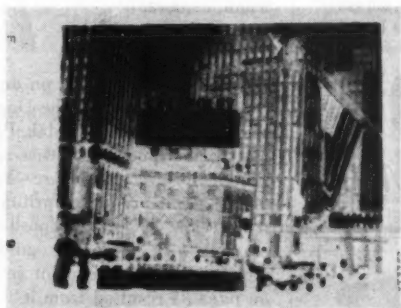
"STOP THE PROJECTOR and let's look at that again," someone shouts as you're right in the midst of showing one of your films. A single frame caught his attention—a shot of a child with a particularly beguiling expression, or a scenic, or an exciting bit of action. It occurs to you that the frame would have made an interesting still photograph. And how often have you been badgered by friends or family for stills from your films that could be placed in an album? Well, you *can* convert movie footage into stills right at home without a darkroom.

First, you need a negative of the movie frame. Two devices are available that make it easy to produce black-and-white or color negatives and transparencies from single color movie frames, or black-and-white prints

from black-and-white movies. What makes them work?

One, the Duplikin for enlarging 16mm, can be used with many rangefinder or reflex cameras having interchangeable lens mounts. The unit, shown *below*, fits right into the lens mount in place of your camera lens.

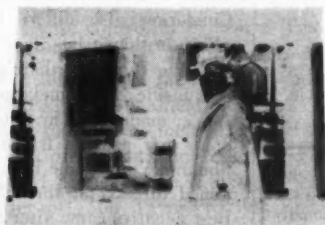
The barrel-like part of the Duplikin is similar to an extension tube. At one end of the tube is a film gate hinged with a built-in light diffuser in its center. A screw-down lock holds the 16mm frame to be copied firmly in place on aligning sprocket holes. Inside the tube there's a regular C mount for a 25mm lens and you can use your own movie camera lens or buy the unit with an Elgeet 1-in. f/2.5. (If you use your own lens, the unit is \$39.95; with *(Continued on page 86)*



YOU GET THIS NEGATIVE: This is the actual size of a negative or transparency made from an 8mm frame. Image area measures about $1\frac{1}{2} \times 2\frac{1}{8}$ in. (The 16mm Cinelarger produces a $2\frac{3}{16} \times 2\frac{1}{8}$ in. image.)



AND THIS FINAL PRINT: Enlargements to 4 x 5 from 16mm frames produced adequate results, similar to snapshot quality. Although color slides can be made successfully, avoid trying to project them to great size.

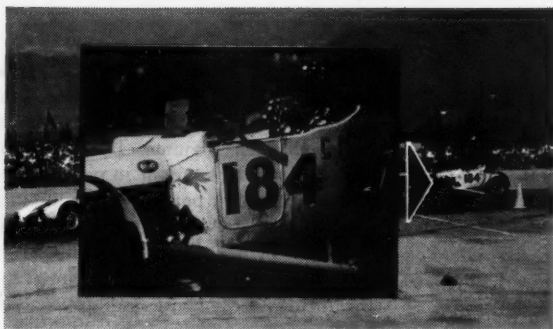


YOU GET THIS NEGATIVE: The Duplikin produces full 35mm ($1 \times 1\frac{1}{2}$ -in.) negatives. You can make color enlargements (slides or prints) by using Tungsten type transparency films. They work nicely with RFL2 lamp.



AND THIS FINAL PRINT: Distant scene enlargement of 8mm color film shows quality of moderate blowup. A contact print, however, generally will be sharper. Conclusion: Don't blow up with 8mm too far.

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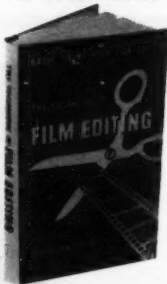
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Few text books pass the 50,000 copy mark. You can be sure those that do are classics. One such is the internationally famous 35mm Photo Technique, by H. S. Newcombe, which has sold 60,000 copies. Many of MODERN's readers who work in 35mm are familiar with this jam-packed, inspiring work. It will be news to all however, that a 13th edition, covering new camera design, color, films, etc., has just made it's appearance, and is now in stock at your camera or book store, or at Amphoto, 33 West 60th, New York 23 (price \$4.50).

MOVIES

(Continued from page 85)

lens it is \$59.95.) You can get a Duplikin with mount to fit Leica, Nikon, Pentacon, Praktina, Exakta, and camera bodies with similar mounts. Here's how you use the Duplikin. First mount the unit (Duplikin and camera) on a tripod for maximum steadiness after loading with film. Direct light from an RF12 flood lamp or the diffusion screen so it will pass through the movie frame. You expose with the camera shutter.

In testing the Duplikin we found it best to increase light diffusion by placing a piece of white paper on a wall a few inches away from the front of the Duplikin. The flood lamp was aimed from about a foot away at the paper and the diffused light bounced into the front of the unit. This cured a tendency of the Duplikin to concentrate too much light on one part of the negative film in the 35mm camera.

Exposures vary

Our tests were based on an exposure chart that comes with the Duplikin. We liked a negative on Kodak Plus-X that had been exposed for 10 sec., although practically every exposure—ranging up to 50 sec.—produced printable negatives. The 10-sec. exposure agreed closely with exposure guide recommendations and the print in the chart on page 85 resulted from it.

The second device shown is the Cinelarger which comes in both 8 and 16mm models (\$19.95 for either one). In contrast with the Duplikin, the Cinelarger is basically a complete copying camera. There's a hinged metal film gate with a diffusion screen at the front of the approximately 6 1/2-in. long plastic body. The other end is loaded with either 620 or 120 film just as any camera is loaded. The 8mm unit produces an image of about 1 1/2 x 2 1/8, while the 16mm model offers a 2 3/16 x 2 7/8-in. image. The Cinelarger also differs from the Duplikin in that it has its own shutter. As with the Duplikin, there's a fixed focus lens inside each Cinelarger.

We made our first tests with the 8mm unit using a frame from a color film and Verichrome Pan. The flood was aimed directly at the diffusing screen. Best negative came after an exposure of about 20 sec. on Kodak Verichrome Pan. Incidentally, exposure is largely subjective—depending on the density of negative you prefer and the distance between the front of the unit and the flood lamp. The closer the lamp to the unit the less exposure needed, a long exposure results in a denser negative than you would get from a relatively shorter exposure.—NORMAN ROTHSCHILD

the MOVIE MAKER

by MYRON A. MATZKIN

Major irritations over relatively minor problems—or how manufacturers could make life easier.



For the past few years I have found myself getting slightly irritated on a highly personal basis with various types of equipment. So irritated, in fact, that I am about to mount my rather spavined charger

and have at a few windmills. My particular windmills are those things on cameras, projectors and tripods that should be there to make motion pictures easier—but quite obviously are lacking. And it's not just a few specific cameras or projectors with which I find

myself at odds. If one is going to charge anything—it should be big. So, I'll level my lance at equipment in general.

Undoubtedly you wonder why certain things aren't done. One reason might be simple economics. Even a minor addition to a motion picture camera can involve months of planning, new tools and dies, changes in production scheduling and retraining of personnel. All this adds up to more expensive production—and a higher retail price tag on the camera. With that in mind, there are still additions and changes I would welcome. I'll start with projectors.

Power cords: Frankly, on most projectors I've seen or used, the power cord seems to be a mere token gesture, five or six feet of electric cord at best. Almost invariably, I find myself setting up at least eight feet from the nearest outlet. This means using an extension

(that's the thing someone trips over, stopping the projector at a crucial point in a scene). I would like manufacturers to include either a 15-ft. cable as standard equipment or an extension with an interlocking device. Such a device would prevent the two lengths of power cord from disconnecting.

Storage space: What do you do with the power cord when you store your projector? Me? I usually put it in a safe place whose whereabouts I proceed to forget the next time I need the cord. I find wrapping it around the lamp housing unsatisfactory—since closing the projector becomes difficult. Only a few projectors have cord storage compartments. How about a spring-powered reel on the projector base that automatically takes up the cord in a neat spool?

Speed controls: Many 8 and 16mm silent projectors have rheostat controls for regulating projection frames per second. Seems sensible to me that the 16 and 24 fps positions could be marked. I usually have to fiddle with the control while projecting to get an approximation of correct speed. I can't always prepare for a screening before guests arrive.

Reel arms: Practically all 8 and 16mm projectors have 400-ft. reel capacities (a few 8mm machines have less than 400-ft. reels). This sounds like a lot—until you go off on vacation and

(Continued on page 88)

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THE MOVIE MAKER

(Continued from page 87)

shoot 500 feet of film. Might be a good idea to make bigger reel arms available as optional equipment.

Now on to cameras.

To see better

Viewfinders: Not too long ago I shot a 15-ft. sequence with what I thought was the normal lens—at least that's what the viewfinder indicated. Unfortunately I forgot to check the turret and the processed film made it quite clear that I had filmed with a tele—which resulted in headless people and out-of-focus background. With matching front element finders I wouldn't have made this error. With variable optical finders it's easy, unless I remember to pay attention. One camera has a finder that indicates what the field is when looking through it. A number corresponding to the focal length of the lens that should be in position shows inside the finder itself. Another sets the finder when you position the lens. I'd like to see more finders such as the latter one.

Rangefinders: I once saw a movie camera with a rangefinder and I've remembered it lovingly—and longingly. I know that cameras with through-the-lens focusing represent the best solution—and the most expensive one. But I can see no reason why a simple, inexpensive rangefinder system can't be added to cameras having separate finders. Despite all the talk about the tremendous depth of field of normal and wide-angle movie lenses, out-of-focus shots are not unheard of. In fact, at lens apertures of f/4 or lower, fuzzy images are a definite possibility for those of us not gifted with the eye of an eagle for distances.

Unstandard standards: Most motion picture cameras with provision for interchangeable lenses have thread mounts—D for 8mm and C for 16mm. Have you ever found that your new lens won't seat deeply enough or perhaps seats too deeply? In both cases you usually end up with out-of-focus shots. In the latter situation the rear of the lens mount also is scored. Blame it on the camera mount most of the time. Quite often, the metal gauge in the turret is much too thin to accommodate a sufficient number of threads. What is needed is a standard thread depth agreed upon by all manufacturers.

And how about that tripod? Having trouble with it?

Easier to use tripods

Calibrations on the legs: Quite often, you may find that you don't want to extend telescoping tripod legs all the way. So you try to make all three legs equal. You'd have just as much luck in evening table legs by sawing off the end of the longest one. The results: lots of low tables and unbalanced tripods. A simple set of marks or calibrations on each leg would end the problem.—THE END.

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The NEW 1959 KODAK LINE Reduced

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LENSES

(Continued from page 51)

In the early 1900's glasses available to the lens designer included mixtures of silica, barium, iron, cobalt and other familiar elements and materials. If the designer wanted to increase the magnifying power of a particular lens he could select a glass with more density which thus had a high index of refraction and so was capable of bending the light rays to a greater degree. But as the index of refraction increased, the glass showed a greater power to disperse white light into the various colors of the spectrum—red, yellow, green, blue and violet. This meant that the high index-of-refraction glasses produced larger color aberrations which had to be removed or at least reduced. Since World War II glass materials have been made using lanthanum, cerium, lithium and other elements. Some of these are called "rare earth" elements, hence the new glasses have been called rare earth glasses. The main feature of these new glass materials is that the index of refraction is high compared to that of ordinary glass, but the dispersing power is low. Thus, the designer can use new glass in a lens to increase the power without running into trouble with

spreading of the colors in the image.

By adding more lens elements, something additional can be done to correct aberrations. In the past, one of the major disadvantages of adding elements was that they produced ghost images because light reflected back and forth from the interior surfaces of the lens. To eliminate these ghosts some of the elements were glued together into one component with transparent cement. To do this the concave curve of one element had to match the convex curve of the next exactly. Lens engineers always prefer the freedom to pick the curves and lens spaces without such a restriction. Lens coatings cut down internal reflections effectively, making possible better designs with more individual air-spaced (non-cemented) elements for the very fast lenses. But even with the latest advances in glass manufacture, there are limitations. As lens speeds increase, spherical aberration and astigmatism usually get worse. The four-element Tessar design (illustration A, page 49) cannot be used satisfactorily at speeds faster than about $f/2.8$ in a normal lens for a 35mm camera. Even at this speed, high quality has been possible only since the new rare earth glasses have been used. Since 1950 several good four-*ele-*

(Continued on page 92)

THE LARGE CAMERA

(Continued from page 28)

In deciding which of the two cameras to buy you should consider the following:

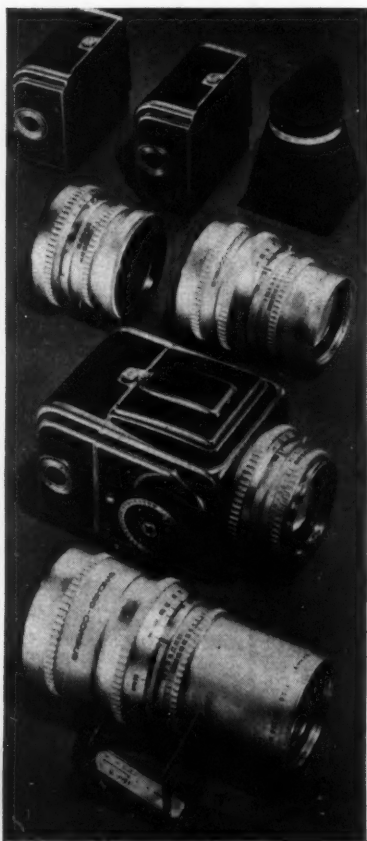
Do you want to use 4 x 5? When working with this size negative the Kardan-Color is out of the question. Converting it to 4 x 5 would be a clumsy operation.

Do you need a more sturdy camera? The larger sizes of Kardan-Color are heavier than the corresponding Sinar models. Therefore, the former is a trifle less likely to be harmed by careless handling.

I don't mean to say that the Sinar is fragile—it most definitely is not! But a Sinar will stand up better in the hands of a person with a careful touch than when treated with indifference.

If I had a commercial studio and needed at least a 5 x 7 camera I would buy the Kardan-Color. On the other hand, if I wanted the camera to use myself while traveling I would choose the Sinar. It is lighter and somewhat more versatile under unusual circumstances.

For information about the Kardan-Color write to the Kling Photo Corp., 257 Fourth Ave., N. Y. 10, N. Y. Statistics on the Sinar are available from Karl Heitz, Inc., 480 Lexington Ave., N. Y. 17, N. Y.—THE END



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LENSES

(Continued from page 90)

ment designs have appeared for the 35mm camera. The Japanese manufacturers, using rare earth glass, have evolved designs from the Tessar formula which reach a high level of performance at wide aperture. However, in recent years, the triplet has been further developed into a five-element lens (the Schneider Xenotar is an example) with performance improved over the four-element Tessar formula.

Fast lens: complex design

Faster lenses ($f/2$ or more) have more complex designs. However, the layout of the designs is based upon a very important feature of optical theory. If a lens is made very thick it can have a strong corrective effect on the aberrations of an assembly without adding much magnifying power (without changing the focal length of the design greatly). The basic principles can be traced back to the studies of a great German scientist of the 19th century, Karl Friedrich Gauss. Gauss first used deeply curved elements without much magnifying power to improve sharpness and quality. By 1920 Taylor, Taylor and Hobson had introduced designs which have come to be known as "fast symmetrical" types (see Glossary, page 46). One of the outstanding lenses of this type is the Biotar (illustration B, page 49). Arthur Cox, in his book *Optics*, points out many newer designs which have been evolved from the Biotar. Notice how the inner lens elements have outside curves which are very nearly parallel. This means that these elements do not have great power but can correct the aberrations of the whole design considerably. Today, rare earth glass has been applied to this design, with great success. These glasses permit smaller changes in the lens curves to bring about larger corrections in the aberrations. However, in the fast lenses which we're now discussing, zonal spherical aberration and astigmatism cannot be completely controlled. Designers of fast lenses compromise these problems by shifting focus (illustration bottom left, page 48). Basically, here's how this works. The designer shifts the best average focus about a half millimeter toward the lens. At this point the flat film plane intersects the curved astigmatic focal plane in the best compromise position. As a result, the lens, when used wide open and focused accurately, is set to the best average focus. The main trouble occurs when the lens is stopped down somewhat—focus changes or shifts slightly. Many of the earlier $f/2$ lenses shifted focus considerably in this manner. Since 1950, with the very highly improved fast lenses, this problem has

been solved, again by applications of rare earth glass and new designs.

The Gauss-type lenses, the Biotar and its descendants do not strictly follow the classic triplet formula (illustration A, page 49), which gave us the Triotar, Trioplan, Radionar and Cassar lenses; but they have produced many fast and superfast lenses (illustrations B and C, page 49). The four-element Petzval lens, designed in 1841 by Josef Petzval, has also been used as a base for some fast and superfast lenses. In Petzval's original lens, which reached a top speed of about f/3, high speeds were obtained by using a front component consisting of two elements plus two air-spaced rear elements close together. Although the lens was sharp in the center, edge fall-off was rather marked. The rear elements of the old Petzval design were then expanded into three separate elements with air spacing between them. This was the basis of the Carl Zeiss lens series called the Sonnar. Speeds of as high as f/1.5 were obtained even in the early 1930's. This formula is essentially that used in many of the recent high speed lenses, such as the 50mm Nikkor f/2 and f/1.4 lenses, as well as in extra high speed lenses in the 75 to 90mm focal length range.

The Petzval-based lenses have excellent color correction, but in general,

the aberrations away from the center of the picture are difficult to reduce. Thus the longer focal lengths, with the smaller field angles, have been most successful. For the 50mm and shorter focal lengths, the symmetrical, thick meniscus lens designs following Gauss's principles have been much more popular among designers and manufacturers of 35mm camera lenses.

When we look at lenses of extreme speeds, such as f/1.2, the basis of the design and the number of elements is not easy to fix. Some extreme speed lenses have followed the Petzval formula, although many fast and superfast lenses use designs combining some features of both Petzval and Gauss.

Superfast lenses have given designers a very difficult problem of controlling the off-axis aberrations. Hence the almost universal characteristic seen in pictures shot with such lenses: good central definition with bad fall-off in the corners.

The unique telephoto

The telephoto lens is a specialized design with problems of its own. Basically, the design sets a negative lens far behind the front positive lens (see Glossary, page 46), but somewhat in front of the film plane. The result is a big increase in the effective focal length

of the lens without a large increase in the over-all length from front element to film (illustration 1, page 49). This is the mark of a true telephoto design. For example, a 16-inch focal length telephoto lens may be only nine or ten inches from front lens to film plane. However, there is a serious problem. If the effective speed of the entire lens is to be kept high, say f/5 or more, then a very large front element is necessary. This results in great zonal spherical aberration. To overcome this, modern lens engineers have designed a front positive lens component which consists of three or more elements close together. With very careful planning the performance of the lens can be kept high even though the speeds may be increased to f/3.5 or more. Recently, German and Japanese telephoto lenses have been made with five or six elements, with a thick meniscus or negative element slightly behind the front elements (illustration 2, page 49). This element helps to correct the astigmatism, as well as the pincushion distortion (illustration, bottom, right, page 48) common in tele lenses, without affecting the other aberration corrections.

Recently, very long focal length camera lenses have been made using curved mirrors. By themselves, such reflecting
(Continued on page 94)



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LENSES

(Continued from page 93)

optics have no color error. However, it is almost always necessary to use one or more lenses in addition to the mirror optics to cover the film area. One reflecting optics design utilizes a large concave mirror, which acts just like the front section of the usual telephoto lens, and a small convex mirror which acts like the rear negative lens of the telephoto. The result is an extremely long focal length with a very short barrel (illustration 3, page 49).

Wide-angle speed up

Wide-angle lenses have recently become increasingly important to the 35mm camera fan. The earlier wide-angle lenses were used in the mapping and aerial photographic fields. In these lenses the main problem was the complete elimination of distortion. The Hypergon was one of the first to be developed. It was introduced by Goerz in 1902 and was characterized by very deeply curved front and back lenses, symmetrically arranged around a central stop (illustration 4, page 50). Since almost any attempt to increase the speed was accompanied by an introduction of image distortion—the inability to reproduce object lines accurately, in this case barrel distortion (illustration, bottom right, page 48)—these lenses were used at speeds no greater than $f/10$. They had serious spherical and color aberrations. But recently, Bausch and Lomb developed the Metrogon series of lenses for the U. S. Air Force. They can be used at $f/6.3$. The Metrogons have almost no distortion. Excellent wide-angle lenses of this symmetrical design have recently been made by Joseph Schneider & Co. under the name of Super Angulon (illustration 5, page 50). These lenses show very little distortion. The other aberrations are sufficiently corrected to allow them to operate (theoretically, at least) at speeds up to $f/6$. However, Super Angulons have been made with speeds up to only $f/8$. But a 21mm $f/4$ lens of similar design has been made for some 35mm rangefinder cameras.

Retrofocus solves a problem

But with the advent of the single-lens reflex 35mm camera, the wide-angle lens of medium and high speed faced a serious difficulty. The shallow camera body of the Contax or the Leica permits the mounting of wide-angle lenses with the rear lens fairly close to the film plane. However, the moving mirror in the reflex camera prevents this design from being used. A new wide-angle lens design was necessary. This is called the "inverted telephoto" or retrofocus lens

(illustration 6, page 50). As the name indicates, a negative element is put in front and a smaller positive element behind it. The negative element produces an image which is smaller in angle and a little ahead of the front element. The positive element then focuses this onto the film. As a result, the lens sits fairly far out from the camera body, yet the effective focal length is kept short (illustration 7, page 50). The design produces one serious problem—barrel distortion (illustration, bottom right, page 48). As the name implies, a square object becomes barrel-shaped (sides bend outwards). One of the ways out of this problem is to increase the distortion in the back section in the opposite direction. The results are good enough for most purposes. Incidentally, these lenses can generally be made with fairly wide maximum openings. Some of the Angenieux retrofocus lenses currently have speeds to $f/2.5$.

While the retrofocus design has been utilized for focal lengths down to 24mm or so, and speeds up to $f/2.5$, Japanese designers very recently have gone back over the symmetrical fast lens arrangements to see just how short the focal lengths could be made for rangefinder cameras without excessive loss of image quality. Some of these new fast symmetrical types have, with minor modifications, been pushed down to an effective focal length of 35mm with very high speeds—to $f/1.8$ and $f/1.5$. By carefully compromising between the various aberrations the image sharpness has not been made to suffer unduly. Rare earth glass is used extensively—in some cases in as many as four elements out of seven.—THE END

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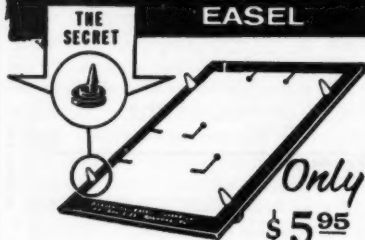
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WM. KLEIN

(Continued from page 58)

composed myself," he explains. "The individual picture counted less than the sum total effect of the entire book. As a result I had a complete freedom. It is the only way that I can make documentary photographs."

Klein tried to bring along some part of the documentary approach to fashion. Fashion photography, Klein found, was stylized and demanding of good technique. So he learned the technical side of picture making. "In documentary photography," says Klein, "the document came first. The style was straight. I used one camera, two lenses, existing light. In fashion, I tried tele lenses for the first time, also controlled studio lighting and electronic flash. Now I believe I can adapt some of the techniques learned in fashion to my reportage."

(We breathed a sigh of relief in noting that Klein's latest documentary work—for the Rome book—bears evidence of better technical control over the 35mm camera.)

Just as Klein found certain facets of New York life humorous, specific attitudes in the fashion field also struck him with amusement. "Humor is important in fashion," says Klein. "For me, beautiful women in order to be human must have a sense of humor."

Klein's humor in fashion photography is slightly on the sly side. Over-decorated lamp posts burgeon directly from a model's head (picture, page 58) in a direct challenge to the photographic maxim stating that lamp posts must not do anything of the kind, smoke emanates from a model's mouth like the full billows one might associate with steam railroading (picture, page 59). In other pictures, exotic models battle furiously and hilariously with the problems of modern living—the use of an electric hairbrush or how to get a pair of skis into a Rolls-Royce.

Has documentary and fashion still photography become Klein's true love and has he, forsaking all others, promised it his undying fidelity? Not on your life—or Klein's. Right now he's hard at work on a number of motion picture projects.

"I haven't abandoned painting or design," he adds. "In this day and age, photography is a graphic art and should be at the disposal of graphic artists."

Although Klein has specifically called photography a "graphic" art, he definitely opines that great photographers can produce "great photographs." What makes a photographer great?

"The same thing that makes a great painter or writer," answers Klein: "Something to say and a way of saying it."—HERBERT KEPPLER

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PIX MESSED UP

(Continued from page 73)

the child for a 50mm lens. But I didn't dare go closer. I think it is wrong to be ruthless with a camera. It is a matter not merely of morality, but of taste, personal style, your relationship to other human beings. If you wouldn't ordinarily intrude on privacy, I don't think a camera should turn you into a less sensitive person.

With the little girl, however, I certainly felt safe, because I was shooting from behind and nobody, unless it were her mother, could possibly identify her. The interest was in that marvelous little ballooning ballet-like skirt and the line of leg.

Now, I had several problems here. First, I hadn't taken my camera out of the bag. This was inexcusable. Second, I had the 50mm lens on. Here, with a 50mm lens, though I wanted to go close, I didn't want to go embarrassingly close. So I had to shoot from across the other side of the little bridge. Third, the good shot I first had seen had changed by the time I got my camera out. There had been another little girl, about eight in a soft, quiet, unstarched gray dress with little decorative embroidery on it, looking with admiration at her more daring and picturesque friend. The contrast was charming. By the time I got my camera out of the bag, the other girl had departed the picture and was 20 feet away, mingling unphotographically with a group of women and children. All I had left was the ballet girl.

A second look

This time I had enough presence of mind to revise my objective. What I wanted now was that marvelous circle of ballet skirt and leg. Nothing else. But I couldn't get that without going closer than I felt I wanted to. Somebody would have warned her, and that would have been the end of it. Also I couldn't have done it, anyway. I couldn't insult such a nice little leg in public. A 90mm lens would have done the job.

Now, you might say, "Why didn't you crop it?" I could do that, but the quality of enlargement would not have been good enough. I still might have been content with the picture as it was, but her head got lost in the foliage across the lake. Before I had gotten the camera out, the sun managed to illuminate the rim of her head and separate it from the trees and bushes. When I was ready, the sun had become tired of waiting. On the whole, I would say it's another "almost" picture.

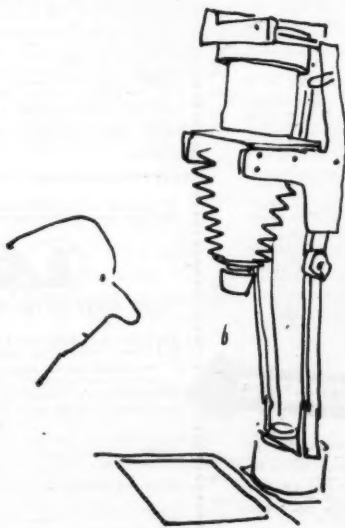
Now, the shot with the empty rowboats. That was very sad. There was a small boy, a bright kid, about eleven, with a shock of straw-colored hair and

a merry face. He was out of the picture at the left. I could see he was starting an adventure of going across those rowboats. I got out the Leica. Naturally, you can't see it in the picture, but between me and the boats was a big wire fence, the wire woven in little squares barely allowing a camera lens through.

Near miss

I was using the 50mm Summicron f/2 lens. I had to decide through which of those wire openings I was going to put the lens in order to catch this boy. Instead of shooting whatever I could get as fast as I could, changing position with him as he got out toward the middle, I set my camera into the wire on the spot where I thought he would make the best shot—the third boat from the left. He was coming from behind the first boat on the right, looking in that direction. Then he changed his mind, or somebody called him—I couldn't tell, I was too concentrated—and he started back. So I yanked my camera out and tried to catch him. The angle was such that wherever I shot there was wire or an iron post between him and me, and besides, he was not interesting once he stepped away from the boats on to the stone pavement of the wharf. So there is another picture which might have been a wonderful one that I missed. I took about nine shots of the empty rowboats anyway, hanging around, hoping at least for a happy photographic accident in the far background on the rise of land. But the small dots of people were too distant and never formed a design—chain of beads—for me.

I'll go back and I'll get something some day in the right part of the foreground. Maybe you'll go there and beat me to it.—THE END



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MODERN TESTS

(Continued from page 81)

the gun adjusts for either bounce or direct flash. A small 16-oz. 240-volt battery in a plastic case fits into a pocket or attaches to your belt. A coil cord connects battery to the flash head.

Testing the unit in a small room with light colored walls, we found the guide number for Kodachrome to be 14 and for Anscochrome 20. With a booster unit, which attaches directly to the barrel and provides increased power, Kadachrome guide number is 20 and Anscochrome 30.

The light output of the gun, with or without booster, is definitely adequate for the photographer working in black-and-white or with color for portraits or small group shots.—M. A. M.

BORDERLESS EASEL FOR 11 X 14 PRINTS

Manufacturer's Specifications: Clarke Borderless Easel. Print size: Adjustable by removable rubber pegs for 5 x 7, 8 x 10 and 11 x 14. Price: \$5.95. Manufacturer: Clarke Co., Box 2123, Roanoke, Va.

The maximum print size on the Clarke Borderless easel for bleed prints is 11 x 14. But there's nothing to prevent a do-it-yourselfer from taking the basic components of the unit and making a 14 x 17 easel in as little time as it takes to drill five holes.

This is how the Clarke easel works. There are four grooved rubber pegs that can be positioned for 5 x 7, 8 x 10 and 11 x 14 borderless (bleed) prints. The pegs fit into holes drilled at corners of an outline representing each of the three print sizes on the easel. The paper fits snugly in the grooves of the rubber pegs. An additional peg made of wood positions the paper and prevents it from getting out of alignment.

To make a 14 x 17 easel, all you need is a piece of fiberboard a little larger than 14 x 17. At the proper spacing drill holes which are the right size for the rubber pegs. Drill a fifth hole at one end of the easel for the wooden positioning peg.

We tested the Clarke easel in our MODERN darkroom and found that ends of the paper did tend to curl slightly, but not enough to cause a finished print to be unsharp if the enlarger lens is used at moderate apertures.

Surprisingly enough, the rubber pegs left no tell-tale white marks at the edges of the print which had to be trimmed away.—M. A. M.

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BRAND NEW GRA-LAB UNIVERSAL TIMER
The most useful complete automatic timer for your darkroom. Seconds, minutes, rings and cuts off enlarger or appliances.
Standard Model \$165
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Eliminates Dust from Negatives and Slides
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Action editor, large image, w/splicer. All metal compact construction.
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Needle sharp F3.5 4-element lens, MKV, 1/400 sec., self-timer. Dual focus lever, brilliant view screen.
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Eveready Case ... 15.00 **\$10.50**
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BRAND NEW 35MM TOYOCA CAMERA
F2.8 Cpld. R.F., Rapid Advance Flash Sync, w/case
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RUSH—LIMITED QUANTITY



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Large magnification light lock, for 35mm, 828; or super slides, includes standard batteries.
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Model 500, List \$4.50... **Special \$3.00**
Remote Control Cord... Add 3.95
Non spill trays, List 1.25, Only .75 ea.
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SENSATIONAL YASHICAMAT

(Fully Automatic Reflex Camera)
F3.5 4-element lens, MX flash sync, self timer, 1/500 sec.
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Brand New, Factory Packed, Guaranteed



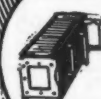
BRAND NEW—TWO NEW ADDITIONS TO THE YASHICA REFLEX FAMILY

Yashica 44-127 film, 12 super slide exposures, 1/500 sec., MX, click stop, crank transport.
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List 60.95 **SPECIAL \$45.95**



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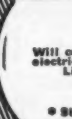
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HOLDS 35 35MM SLIDES, PREVENTS WARPING, FRAYING. LIST 2.25
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Air-luggage case for 24 only 7.95



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Built in Meter, 35mm Adapter, w/Case
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Will convert your 8mm camera to a modern electric eye camera.
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* Standard "B" Mount Camera Only

8mm ACTION POCKET VIEWER

Now you can show your 80' reel of film in true movie action using any light source

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Satisfaction Guaranteed

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F2.8 Lens, complete outfit with meter, flash & case.

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Ricoh 300 Outfit, 35mm Camera w/case & flash	\$ 54.95	\$ 36.95
Kodak Starmatic Automatic Brownie 98 lens	\$ 34.50	\$ 23.95
Taron 35mm cpld. R.F., f2 with case		\$ 42.95
Exakta V11A w/biatar auto f2 pentaprism w/meter, case	\$414.95	\$265.00
Koytone K-100 proj. 8mm w/case	\$ 99.95	\$ 68.95
Dejar "750" proj. 8mm w/case	\$166.00	\$109.95
Dejar "1000" proj. 8mm w/case	\$179.00	\$117.90
Polaroid print copier (Specify Model)	\$ 29.50	\$ 21.95
8mm Kodachrome roll day or "A" min. order 3	\$ 2.10 ea.	
8mm Kodachrome mag. day or "A" min. order 3	\$ 3.20 ea.	
135 Kodachrome 28 ex day or "A" min. order 3	\$ 1.50 ea.	
135 Kodachrome 36 ex day or "A" min. order 3	\$ 2.10 ea.	

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Brand New BUY DIRECTLY FROM POPULAR AIRES V

ONLY \$119.50

Interchangeable F2.8 Lens Complete w/case. List \$74.50

JUST ARRIVED AIRES VISCONTI
F2.8, LVS, MKV, 500 Sec. Rapid Advance, Auto Frame Counter, Rapid Rewind.
List w/Case \$3.48 **SPECIAL \$57.95**

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ROYAL.9 **FINEST IMPORTS**

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With built-in exposure meter, seven element f1.9 lens, 9-speed shutter to 1/500th & B; MVX synchr. for flash & strobe; selftimer; coupled rangefinder, luminous viewfinder with bright frame; single-stroke lever; rapid rewinding; accessory shoe; etc.
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with f2.8/50mm 5-elm. coated lens
Case ONLY \$4.95 List \$82.95 ONLY \$34.45

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BEAUTY SUPER 'L'

Built-in Exposure Meter with newest plug-in Amplifier Fast f1.9/45mm coated lens.

- Cross-coupled LVS shutter, speeds to 1/500th
- Full MX flash synchronization
- Coupled Range/Viewfinder w/parallax correction
- One-stroke rapid film wind, shutter cocking exposure count.
- Plus many deluxe features

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Sensationally priced at only **59.95**
Leather Eveready Case only \$4.95

BEAUTY Super
with f2/45mm lens, speeds to 1/500th, coupled range/viewfinder single-stroke film wind, etc.
Compar. List \$79.95
Eveready Case only \$4.95
ONLY \$39.95

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BRAND-NEW TANACK
List \$169.50
\$69.95
FREE lens hood & sunshade!
f2/50mm lens alone \$34.95

E. R. Case 4.95
Luxury 35mm w/interchangeable lens system (Leica thread) • Tanar hard ctd. 6-elm. f2/50mm • Built-in synchr. for flash, strobe • Coupled Range/Viewfinder • Focal plane shutter, 12 speeds to 1/500 • Autom. filmwinding & shutter cocking.

Terrific Savings! Brand-New
FULLY AUTOMATIC 2 1/2 x 2 1/2
Famous Make
Twin Lens Reflex

10 shutterspeeds to 1/500 sec. Fully automatic film advance & shutter cocking, famous f3.5/80mm 4-elm. coated taking lens, f3.2/80mm viewing lens, MX Flash Synchro. Eye-level sportsfinder, brilliant magnifier, double exp. & double exp. prevention devices.
List \$75.50 Slashed to **ONLY \$39.95**
Case List \$10.00 — ONLY \$4.95

Brand-New Import! High Power! Coated
Prism Binoculars
All center focus
List Special

6x30 CF	31.50	14.50
7x35 CF	33.50	16.95
7x50 CF	39.00	19.95
8x30 CF	33.50	15.95
10x30 CF	49.95	24.95
16x50 CF	54.95	28.95

FREE genuine leather case & Strap.
Add 10% P. E. tax.

Brand-New Razor Sharp
200mm F3.5
5 ELEMENT
Preset Telephoto Lens
List Price \$149.50
89.50
SALE
For Praktica and Exakta Mounts

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Full Money-back Guarantee with 15 day return privilege. All merchandise BRAND-NEW, except where listed otherwise. All prices FOB New York Add approx. postage. On COD send 20% deposit, please!

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PETRI
\$2.8
\$29.95

With fully sync. shutter speeds to 1/300, single-stroke film lever, coupled range/viewfinder, exposure guide, List \$49.95
Leather Case 4.95

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Exa, Praktica, Pentacon, Contax D, Praktina

f2.8/135mm TELEPHOTO P. S. Spring diaphragm, 6-elm. helical focus, mount List \$89.95
ONLY \$29.95

f3.5/135mm, 4 element, P. S. List \$79.95
ONLY \$24.45

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LEICA M3, CANON, TANACK, Contax IIa, IIib

Fully color corrected — high precision — f/2.8 — 35mm wide angle with viewfinder List \$79.50
\$39.95

f/3.5/135mm telephoto, 4-element, screw mount. List \$79.50 Free case and viewfinder.
\$39.95

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Increase coverage of your camera with **AUX. TELEPHOTO & WIDE ANGLE**

Lenses, hard coated, color-corrected for all models 35mm Aires. Petri, Ricoh, Olympus, Retina, Minolta, Argus, Contaflex, Beauty, Pax M2, M3, etc. Fit into filterholders. Specify camera when ordering.

Aux. Telephoto or W.A. with leather case.
Fits Ser. V adapters ea. \$ 8.95
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Matching Toile or W.A. Viewfinder 3.95
SET of Aux. Tele & W.A. lenses with viewfinder & leathercase.
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Brand-New Photo-Electric **EXPOSURE METER**
Super-sensitive for still & movie cameras, LV-20; ASA 3-1600; incl. leather case.
List \$8.45 — **ONLY \$4.95**

CLIP ON MODEL fits all popular 35mm; ASA 3-3200; incl. leather case.
List \$8.95 — **ONLY 4.95**

METER for all movie cameras, precision-built; with case.
List \$8.95 — **ONLY \$4.94**

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Rush Bargain Bulletin to
Name _____ Address _____ City _____ State _____

DISCOVERY

(Continued from page 75)

Before 32-year-old Chadwick Hall decided to become a photographer he did a lot of other things: Worked in a lumber camp in the northwest; was a sergeant in the Marine Corps during World War II; wrote confession stories in 1956 while recuperating from an operation; wrote for the learned journals (his last article, "America's Conservative Revolution," appeared in the *Antioch Review* in 1955); was a fashion and commercial model for three years; got his B. A. from Wesleyan University; his M. A. from Columbia University and finished all the requirements for a Ph. D. except the dissertation; worked for *The Nation* magazine for two years doing rewrites, layouts, research, editing and writing. Hall has worked on a road gang and painted houses; he's been quartermaster on an oil tanker and acted in summer stock.

The transition

Then how did he become a photographer? Indirectly, through his work as a model. In 1956, Hall (actually, more properly Chadwick, since this is the name he photographs under in order to avoid picture credit confusion with photographer Emma Gene Hall) met photographers Ralph and Mary Steiner. They were interested in using him as a model. They booked him for other jobs — and then suggested he get an agent and try working for other photographers as well, since it was a lucrative profession. Chadwick was studying at Columbia at the time.

Working around and with photography actually revived an old interest in theater and directing. While at Wesleyan, Chadwick and his roommate Giac Casale, had planned stage or movie careers. But these plans fell through and Casale became a commercial artist.

Shortly after becoming a model, Chadwick realized that he was no longer interested in working with an educational foundation or as a college administrator as he had thought.

"I realized that I wouldn't have time for anything but my job, and I didn't like those jobs anyway. It didn't take long for me to see that photography offered a solution."

Today, Chadwick works in partnership with his old roommate Casale. Both of them take pictures primarily for fashion and advertising. Although they work on many jobs together, each has a distinctive style.

Chadwick has a particularly well-developed appreciation of form. There is a structural, almost architectural feeling even in his photographs of people (see page 74). His compositions are definite, precise.—P. C.

EXCELLENT FILM VALUES!

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KODACOLOR

Developing & Color Prints

Developing any size roll.....	\$.70
8 exp. Roll devel. & print.....	2.65
12 exp. Roll devel. & print.....	3.65
20 exp. 35mm devel. & print.....	.85
5 x 7 per print.....	2.65
8 x 10 per print.....	

BRILLIANT COLOR PRINTS

(From Transparencies)

5-Wallet Size from 35mm.....	.95
3-3X (1 1/2 x 3 1/2) From 120 & Stereo.....	.95
3-4X (4 x 5).....	1.55
5 x 7.....	85c each
8 x 10.....	\$1.95 each

KODACHROME

Movie Film Processing

8mm Roll.....	\$.95
8mm Mag.....	.60
16mm Mag. 50'.....	.95
16mm x 100' Roll.....	2.45

35mm COLOR

35mm x 20 exp. w/mounting.....	\$.95
35mm x 36 exp. w/mounting.....	1.80
35mm x 15 exp. Stereo w/mounting.....	1.80
35mm x 28 exp. Stereo w/mounting.....	2.90

DUPLICATE COLOR SLIDES

From Trans. or Negs.

35mm Mounted.....	15c each
-------------------	----------

DEVELOPING SERVICE

AVAILABLE

100' 16mm B&W.....	\$1.25
8mm 25' double B&W.....	.60
8mm 25' double color.....	1.25
16mm 100' roll color.....	2.50
16mm 50' Mag. color.....	1.25

Above color prices refer to Ansco Color and Anscochrome only.

ANSCO COLOR FILM WITH PROCESSING

8mm 25' dbl. roll reprocessed.....	\$2.25
8mm 100' on Bolex Spool reprocessed.....	6.50
16mm 100' roll.....	5.00
16mm 100' roll sound.....	5.00
16mm 50' Magazine.....	3.50

BULK FILM SPECIAL

- Brand New Daylight Film Loader
- 100' 35mm negative film our choice
- 12 empty 35mm cartridges

Yours for only \$5.95

16mm SOUND PROJECTORS

Bell & Howell, Victor, Ampro

SPECIAL USED \$159.00

PHOTOGRAPHIC ENLARGING PAPER

100 Sheet Packages.....	Contrasts 1-2-3
4 x 5.....	SW 1.30 DW 1.60
5 x 7.....	SW 1.80 DW 2.00
8 x 10.....	SW 3.45 DW 4.50

Slightly outdated

SPECIAL SALE!!

OLD MOVIE STARS

12 Films 8mm 200' assorted as follows:

LAUREL AND HARDY	KOKO
OUR GANG	MICKEY ROONEY
CARTOONS	FAIRY STORIES
UNDERSEA PICTURE	WESTERN
	TRAVEL
	AESOP'S FABLES

FELIX THE CAT CHARLIE CHAPLIN
Plus a new Brumberger motor driven 8mm movie projector. List price \$100.00. Our price **\$50.00**

AVAILABLE IN 8mm and 16mm THE FOLLOWING FULL VERSION REELS

The 8mm is approximately 200 ft. and 16mm approximately 400 ft. each reel.

Charlie Chaplin Comedies—1 reels—NEW JANITOR! NABEL'S BUSY DAY, FILM JOHNNY, BETWEEN SHOWERS, CAUGHT IN THE RAIN, HIS NEW PROFESSION, 2 reels—IN THE RAIN, NITE AT THE SHOW, THE CHAMPION, THE TRAMP, HIS NIGHT OUT, DOUGH AND DYNAMITE. The price for silent is \$10.00 per reel and for sound \$12.50 per reel. 8mm \$5.00 per reel.

Religious Films Available

Life of Christ.....	7 reels
Crown of Thorns.....	8 reels
St. Anthony of Padua.....	8 reels
Seasoner of the Blessed Virgin.....	9 reels
Sound.....	\$15.00 per reel
8mm.....	\$ 7.50 per reel

HAL ROACH COMEDIES—

Snub Pollard & other famous stars. Full version—available in 8mm approx. 200 ft. \$5.00 per reel—16mm \$10.00 silent per reel and \$12.50 sound. Approx. 400 ft.

ORIGINAL OUR GANG COMEDIES—available in 8mm and 16mm \$5.00 for 8mm approx. 200 ft. \$10.00 per reel for 16mm silent approx. 400 ft. per reel—available in 1 and two reels.

PRIZE FIGHTS

HEAVY WEIGHT FEATHER WEIGHT LIGHT WEIGHT

Full Version Available 200'.....8mm \$ 7.50 Available 400'.....16mm 15.00 Fights From Early Days Till Present

ACCESSORIES



CINE-PROCESSOR & DRIER
Good for 110'.
8 & 16mm
\$24.50

CHEMICAL KITS—D&B

One gallon size good for rev. reel processing of paper and film.....	\$1.00
Empty 16mm Magazines—3 for.....	2.00
New 8mm Magazines—3 for.....	2.00
16mm 100' camera spoils and cans—3 pair for.....	1.00
35mm cartridges or cans—one dozen for.....	1.00
16mm 800' reels—3 for.....	2.00
16mm 1200' reels.....	1.00
Cans for above each.....	.50
16mm 1600' reels.....	1.25
Cans for above each.....	.50
8mm 400' reels—3 for.....	1.00
Double cans for above—3 for.....	1.00
8 & 16mm Printer-silent and sound.....	\$149.50
Up to 400 ft.....	.25
Film cement, bottle.....	1.45
Empty 8mm Magazines—3 for.....	1.45



MOVIE TITLER
4.95

FILM SALE

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With Processing Included

(FP) Factory Packed OR
(FF) Factory Fresh (Respoiled)
One year expiration date
Fully Guaranteed

KODACHROME

(Same prices apply for Anscochrome)

3 Rolls	10 Rolls
20 Exp. 36 Exp. 20 Exp. 36 Exp.	
(FP)\$8.60 \$12.35	\$24.50 \$36.50
(FF)6.95 11.25	26.50 32.50

SUPER ANSCOCROME

(FP).....	8.95	13.85	29.00	39.50
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KODACHROME MOVIE FILM

With Processing Included!

(FP) FACTORY PACKED OR
(FF) FACTORY FRESH (Respoiled)
• One year expiration date
• Fully Guaranteed

8mm Roll 25' dbl.	3 Rolls	10 Rolls
(FP).....	\$8.95	\$29.25
8mm Mag. 25' dbl. (FP).....	10.95	37.00
16mm Roll 100' (FP).....	24.60	75.50
16mm Mag. 50' (FF).....	16.85	54.50

BLACK AND WHITE MOVIE FILM WITH PROCESSING

ASA 50 Reperforated

8mm 25' dbl. roll.....	\$1.15
8mm Mag.....	1.75
16mm 100' roll.....	2.50
16mm 100' sound ASA 24.....	2.50
16mm 50' Magazine.....	1.90

With purchase of 5 rolls, 1 roll free.

B & W 35mm Film 100' Roll

Negative film outdated.....\$1.25

ROLL FILM

127, 120, 620, 116, 616, Black and White	
ASA 80—5 for.....	\$1.00
20X 35mm B&W ASA 50—4 for.....	1.00
36X 35mm B&W ASA 50—2 for.....	1.00

Respoiled

MOVIE FILM SPECIAL

ASA 50—Reperforated

4 25' double 8mm on camera spoils.....	\$ 1.75
16 rolls as above.....	5.95
64 rolls as above.....	22.00
15 16mm 25' rolls.....	2.75
27 rolls as above.....	4.75
54 rolls as above.....	8.75
15 16mm 50' rolls.....	5.95
27 rolls as above.....	16.75
54 rolls as above.....	19.50
400' 8mm or 16mm.....	3.00

NO PROCESSING ON ABOVE

ANSCO COLOR IN BULK

16mm 4c per ft.—Minimum order 50'.....	
8mm 25' on camera spool.....	\$1.25
4—8mm 25' on camera spool reper. fms.....	4.75
Daylight No. 534 outdated 6 mos.....	
35mm x 100'.....	\$11.95
35mm x 50'.....	6.50
35mm x 27 1/2'.....	4.00

ANSCOCROME ASA 32

16mm with Processing

100' 16mm roll.....	\$8.00
50' 16mm Mag.....	6.50

Orig. factory packed 1959 dated

COLORCHROME

8mm Roll ASA 32.....	\$3.25
----------------------	--------

with Processing within date

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PLEASE INCLUDE POSTAGE—\$2.00 DEPOSIT ON ALL C.O.D.'s

MINIMUM
ORDER
\$2.00

PICTURES in a MINUTE

by JOHN WOLBARST

Bumper crop of timers for Polaroid Land cameras! How to get yourself a Minute Man, painlessly.



Some time ago I wrote about a little timer being sold by Polaroid Corp., its purpose being to time the development of your pictures in a minute. Since then, it has been suggested to me

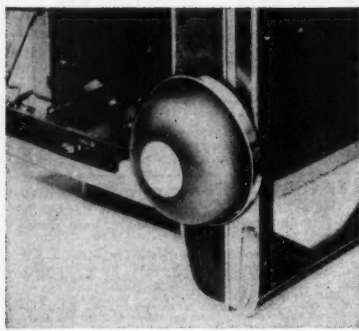
that I ought to describe some of the other timers for Polaroid cameras.

First we have the Tech "One-Minute" Developing Timer, marketed by Tech Photo Products, Inc., 1945 McDonald Ave., Brooklyn 23, N. Y.

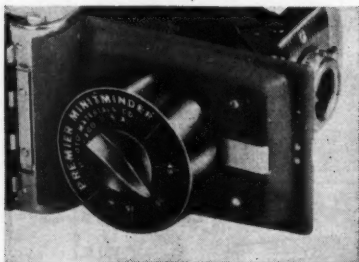
No dainty piece of watchworks, this is a rugged, heavily built affair that screws into the tripod socket of the camera. To set it, you twist the bell housing. It makes quite a buzz for a minute and then a loud bell rings once. I have seen several of these in use in professional studios, and I'm told they are popular in industrial work where a loud signal is needed. Price, \$5.95.

A somewhat similar item is the Premier Minutiminder, made by Photo Materials Co., 2100 W. Fulton St., Chicago 12, Ill. This is also a heavy duty device that buzzes loudly and rings noisily, once, after 60 sec. This one is set by turning an arrow type knob. Markings indicate the number of seconds that have passed. It has a tripod socket screw. Price, \$4.50.

The third item is the Accura Two-Minute Timer, marketed here by Photographic Importing and Distributing Corp., 67 Forest Road, Valley Stream, N. Y. This is a novel design, made to fit the flash shoe of those Polaroid



Tech Timer, above, and Premier Minutiminder, below, are heavy duty, one-minute timers that screw into camera's tripod socket, as shown.

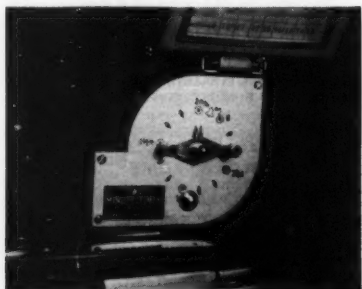


Land cameras which have the flash connection built into the body of the camera. Connecting wires run through the timer to another shoe atop it, into which the flashgun fits. Price, \$5.95.

The timer is made of plastic and metal and weighs three to four ounces. It buzzes vigorously, but the one I had tinkled so faintly at the end of the two minutes that the cessation of buzzing was more noticeable than the ringing. Also, the connecting foot made a rather vague fit with the flash shoe on the camera, so the unit was quite wobbly with the flashgun added to it.

The new Polaroid Minute Man

The mailman recently delivered my copy of the latest edition of the *Polaroid Minute Man*, a 12-page booklet published by Polaroid Corp., and sent free to all picture-in-a-minute fans. It's full of charming pictures, helpful hints on camera use, and describes some really eye-catching "trick picture" ideas. Surprisingly, it's printed by sheet-fed gravure, an expensive process, and the reproductions are beautiful. If you want to get on the mailing list for future issues of this publication, just send your name to Customer Service, Polaroid Corp., Cambridge 39, Mass.—THE END



Foot on bottom of Accura Two-Minute Timer fits flash connection on all current Polaroid models. Shoe atop timer supports flashgun in usual manner.

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BY SPECIAL ARRANGEMENT YOU CAN
TRADE YOUR CAMERA FOR THE NEW 1959 MODELS

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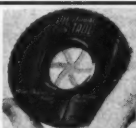
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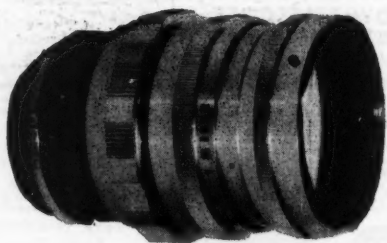
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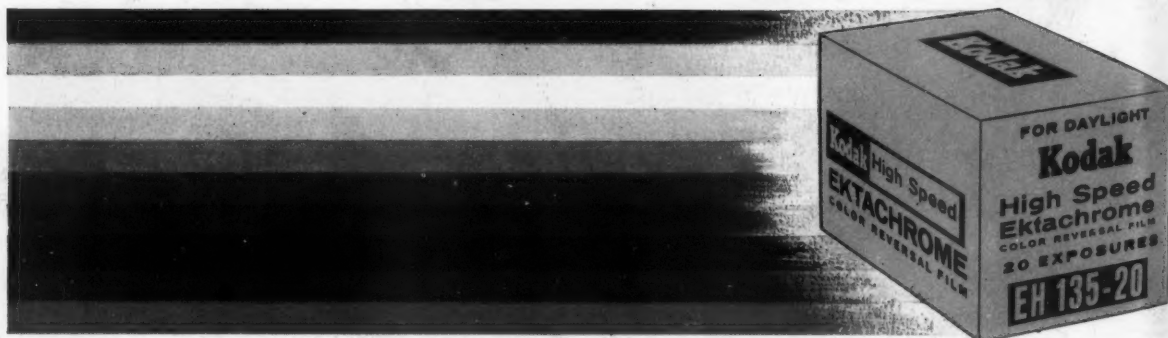
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